

## DES confirms closure of 13 colleges of education

by Brian MacArthur

Thirteen colleges of education are to be closed, the Department of Education and Science confirmed officially this week. It said that the future of another 19 colleges were still officially under consideration.

Eleven major centres of teacher education, each with between 1,000 and 1,500 places for teacher training, have emerged from the reorganisation of the colleges initiated three years ago in Circular 7/73. The future of 110 institutions have now been settled. Agreement has nearly been reached on another 22.

Colleges which will be closing are: Alnwick; Darlington; Westworth Castle; Burnside; Radbrook; Shrewsbury; St Paul's; Rugby; Mary Ward; Nottingham; Coloma; West Wickham; Puteridge; Bury; Linn; Saffron Walden; Sittingbourne; Hereford; Maria Assumpta; London; and Kesteven.

Since the report in *The Times* on July 25, the situation has changed for six colleges. The future of three

—St Peter's, Salford; Culham, Abingdon; and Hockerill, Bishop's Cleeve—has still under consideration. Hereford, Maria Assumpta and Kesteven are closing.

The other institutions whose future is still under consideration are: City of Newcastle, Northern Counties; Northumberland; Middle-Don; St George; Teesside Day; F. L. Calder; Wolverhampton Day; Dudley; Peterborough; Bishop of Kesteven; Leicester; All Saints; Tottenham; Thomas Huxley; Bishop Otter; Bognor; St Oystin's; and Westminster.

The situation of the colleges in October, 1976, became clear this week when the DES announced provisional admission targets for colleges and departments of education, coupled with a student target for 1981, which is 60,000 teacher training places, with an admission of 20,000 non-graduate students next year.

Only three amendments need to be made to the list published in

*The Times* on July 25: Breton Hall will have 350 students, the target for Trent Polytechnic is 950 not 850 and the target for Brentwood is 450 not 400.

The provisional allocation of places in 1981 includes 5,600 for Roman Catholic colleges and 10,000 for Church of England colleges.

Out of the drastic reorganisation, 11 cities or areas that will be major centres for teacher education have emerged: Manchester, which will have 1,850 places in two institutions; Rochampton (1,500); Bath and Bristol (1,400); Liverpool (1,250); Crewe and Alsager (1,100); and Birmingham, Bradford, Gloucestershire, Leeds, Sheffield and Goldsmith's College, London, each with 1,000.

The regional distribution of places is: North—4,200; North West—9,475; Yorkshire/Humber—7,075; West Midlands—7,075; East Midlands—4,535; East Angles—1,350; Greater London—9,690; other South East—10,450; South West—4,580; Wales—3,600. Details for Wales are still to be announced.

## Another turn of the screw for colleges and polys

Local authorities are to be told next week that any increase in student numbers in further and higher education will have to come out of existing resources "as far as possible". For the 16-19 year-olds, there should be no "unduly small" groups, and further steps should be taken to tighten the staff-student ratio.

These instructions are contained in a government circular to be issued by the Department of the Environment next week. It will have a section on such local authority service and will give general guidance on how and where to make the cuts.

It warns quite clearly of very hard times to come, and repeats the statement made by Mr Anthony Croland, Secretary of State for the Environment, earlier this month that in 1976-77 there will be no increase in real terms in local authority expenditure, and that "there will have to be a standstill". It says that existing pupil-teacher ratios should be maintained

and the number of teachers proportionally decreased in the schools where the population is falling. This could lead to unemployment in certain parts of the country.

An education officer commented this week that "it doesn't need a crystal ball to tell you that the topic of this circular means teaching unemployment". The obvious candidates for unemployment were married women returning, students leaving college, and possibly part-timers.

According to other education officers, there are many local authorities who feel that one of the more obvious areas to be cut is higher education.

The circular adds that there is no scope at all for any increase in expenditure in such areas as youth service and adult education. All other local authority departments are being asked to have a severe look at spending, and it appears that money spent on education is going to be the hardest to cut.—TES.

## Armed guards on showcase Turkish campus

from page 1

around the campus, relations between students and the rector broke down last spring. In May a boycott on lectures began, and 95 per cent of students seem to have taken part.

The university authorities stepped up their use of policemen as instruments of academic discipline and students were picked up overnight and taken to Ankara's military prison at Marmak—to be released without charges the next day.

As the end of year examinations approached in mid-July, the university authorities became increasingly desperate in their efforts to return to normal. Military police shut down the student union just two days before the examinations began. But only 78 students from a total population of 9,000 turned up to take their examination papers on the first morning. The next day the number went down to 54.

By now the situation at METU was arousing national concern. The leader of the opposition, Mr Ecevit, has denounced the university administration, and on July 19, 25 MPs from his party tabled a motion urging a parliamentary inquiry into what they claimed was an atmosphere of terror at METU.

Their words had little impact. Two days later, after 12 of them had been picked up by the military police, the students announced that they found conditions in their hostels "unendurable", and would abandon them. The Government responded by giving the rector the right to evict from the hostels any student not attending lectures or examinations.

Only two days later came the first arrest of a faculty member. He was Dr Ali Guler from the faculty of administrative sciences, who was known to sympathize with the students.

The final round of the struggle between students and rector will be fought out in the law courts. The students have already tried to get the Council of State to quash the examinations and on August 1 they staged another attempt on what the students claim is hard evidence that the deputy rector distributed examination questions in an effort to induce his pupils to turn up for his exams.

But whatever the result of the hearing, Turkey's best university has in effect lost a complete academic year in the dispute.

Mr Bernhard, a former Ankara correspondent of *The Guardian* is at Nuffield College, Oxford.

## Sir Robert attacks 'unreal' research in criminology

by David Walker

Social Sciences Correspondent

University research into crime and the criminal law was impractical and often had little to do with reality, Sir Robert Mark, Metropolitan Police Commissioner, said last week.

He attacked "unworldly or impractical academics" who closed their eyes to the fact that some crimes were achieved by fear, intimidation or by the use of force.

In a speech at the Police College, Bramshill, taking up some of the themes first broached in his famous Dimbleby lecture in 1973, Sir Robert singled out recent work on the Oxford Penal Research Unit which drew questionable conclusions from its use of "shaded" juries. These ignored the pressure put on juries by threats, and the exercise of the defence's right to challenge jurors.

Most academic research undertaken at universities into crime and the criminal law has little to do with reality and the practical problems confronting the police," he said.

However, Sir Robert went on to praise the work being done in universities. He spoke of research at the Institute of Criminology at Cambridge University, which he described as "the most important research done by Professor Gordon, done by the Institute of Judicial Administration at Birmingham University."

Mrs Sarah McCabe of the Oxford unit denied that Sir Robert's remarks referred to work done by which was a pioneering study of reasons for the return of guilty verdicts on a normal basis.

"His sweeping condemnation is directed at work which could provide proofs to justify his remarks," she said.

The extent of witness intimidation and protection and the influence of "realities" of which he speaks are not matters for jury research but for an examination of the police and of investigation and detection prior to the criminal charge laid.

Next week

Martin Trow on the implications of slow growth  
Clive Ashwin on the National Gallery  
Science, Creativity and Culture  
Professor F. S. Northridge on Britain and the Far East  
British Association conference

## Nobel winner proposes entry change

An alternative scheme of university entry for students who find examinations difficult yet are capable of original thinking has been suggested by a leading economist and Nobel prize winner.

The privilege of a university education could be earned by such students if they were prepared to give up "the pleasures of youth" and lead an austere life devoted to their subject, he says.

Professor F. A. Hayek, well known as an opponent of totalitarianism and winner of the Nobel prize for economics last year, suggests in next month's *Encounter* that the difference between the type of mind that allows a student to sail through examinations and the type of problem solving mind that tends to fail but produces original thought should be recognized.

He says many great scientists have said pupils and might not have passed conventional university entrance examinations. At the same time many students were good at all subjects yet did not become intellectually eminent.

Professor Hayek, formerly Tooko professor of economic science and statistics in London University, differentiates the mind with great capacity to memorize facts and the mind that puzzles out novel conclusions.

"If there are two such different types of mind who both have their contributions to make to the growth of knowledge, it may well mean that our present system of selecting those to be admitted to the universities may exclude some who might make great contributions."

Professor Hayek doubts whether proof of ability in the subject a student had chosen, together with evidence that he was making progress.

The end of the course would bring its reward, too. Graduates would get ample scholarships and complete freedom.

University ideal now distorted says polys' chairman

The malaise of the British education system has been caused partly by the number of a strange tradition of polytechnic education, according to Sir Alex Smith, chairman of the Committee of Directors of Polytechnics.

Sir Alex, director of Manchester Polytechnic and a member of the University Grants Committee, said that the polytechnics were proud of their difference from universities. They had their own characteristic excellence, not in scholarship but in design, action, the synthesis of ideas, professional training and the application of knowledge.

Yet the universities received three times more money for each student than the polytechnics despite the Government's faith in them as the mainstream of higher education, with a range of teaching duties more extensive than any other institution.

Sir Alex told an audience of Australian college principals in Canberra of his strong personal belief in the polytechnic ideal with its emphasis of the work ethic and its cultivation of artistry and imagination.

The university ideal had become distorted. Universities had pursued expansion into vocational and professional fields for which they were not suited. The university model had given rise to a hierarchy of esteem in which human activities were graded and art put above science, science above applied science, which was above technology, which in turn was above engineering.

## South African detentions spark student protests

by Joan Brickhill

Thousands of students at South Africa's English language universities are participating in the largest protests for three years following the detentions last week of three student leaders, a lecturer and his girlfriend.

All five are being held under the Terrorism Act which allows for indefinite detention, house arrest and solitary confinement. If convicted they face a minimum sentence of five years' imprisonment and a maximum of the death penalty.

The detainees are: Karel Tip, president of the National Union of South African Students (NUSAS); Corry More, an African Students' representative council at the Witwatersrand University; the Rev James Potley, a tutor at the University of Cape Town; and Miss Margaret Riebel.

When the chief of security police confirmed the five detentions, he also disclosed that another nine blacks had been detained, bringing the number of blacks thought to be detained under the Terrorism Act to at least 40, mostly members of the African National Congress Organisation and the National African Youth Organisation.

But the Terrorism Act detentions led to demonstrations and meetings throughout the country involving thousands of students and staff. At Johannesburg 1,000 Witwatersrand University students holding a public picket were pelted with eggs by students from the Rand Afrikaans University.

About 50 members of the Cape Town University staff have sent an open letter to the Minister of Justice asking for a public assurance that "no one held in South African jails or police stations will be physically or mentally assaulted."

The letter states: "We are mindful of the sworn allegations of assault upon persons held for interrogation, of over 20 deaths in detention, and of great suffering and emotional disorder to be observed in persons subsequently released from solitary confinement."

Need for change dominates IAU

from Paul Moorman

The changing role of universities in society dominated the week-long quinquennial conference of the International Association of Universities, which ended here on Monday with a reception in the Kremlin given by Mr V. P. Elyutin, Soviet Minister of Higher and Specialized Education.

Delegates from capitalist, socialist and Third World countries all agreed that far-reaching changes in the structures of universities would become inevitable in the next two decades.

Opinion was divided, however, on whether they could or should continue to combine teaching with research. There was disagreement, too, on the future development of lifelong learning.

More than 900 delegates and observers took part in the conference, whose theme was "The university as the approach of the 21st century". The participants represented 266 universities from 86 countries, the highest ever numbers in the 25-year history of the IAU.

## Sir Alex blames economic crisis on lack of polys

by David Walker

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The university ideal had become distorted. Universities had pursued expansion into vocational and professional fields for which they were not suited. The university model had given rise to a hierarchy of esteem in which human activities were graded and art put above science, science above applied science, which was above technology, which in turn was above engineering.

It had shrunk the area of freedom available to students and had led to knowledge being separated into suitable subject areas which were then studied in great depth in isolation from other subjects.

There was a place for the education of 2 or 3 per cent of the age group as possible scholars, but there was no place for a binary system that imposed different standards on universities and polytechnics.

"I cannot accept that there are any grounds for a permanent, moral, ethical, practical, or entire students taking degrees in universities to have better buildings, better facilities, better equipment, better staff, more residential provision, than students on degree or higher technician courses."

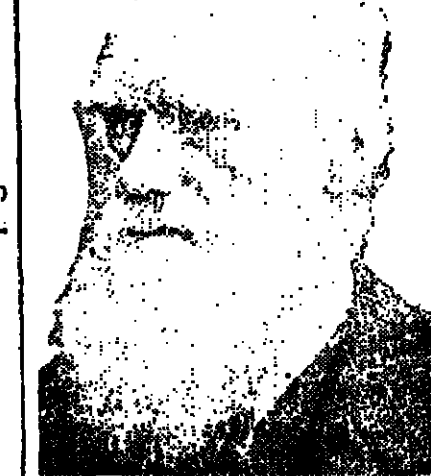
part-time studying at polytechnics the application of knowledge in our community. It is outrageously indefensible work and I will continue to work and work very hard, for the steady removal of these disadvantages.

"I do believe, however, that we need a binary system of institutions—perhaps a bimodal distribution of institutions would be a better description—in which alongside those whose rightful claim is intellectual excellence there are those which are in no way inferior."

Sir Alex said polytechnic staff should be distinguished by their work in industry and the professions and periodic refreshment in "practical" that way their teaching would not be artificially cramped into academic disciplines.

The polytechnics should resist pressures from those within the Council for National Academic Awards who saw the requirement for degrees to be equivalent to university degrees and consequently looked for university-type research in the polytechnics.

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Michael Fores

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More than 900 delegates from 86 countries attended the sixth quinquennial conference of the International Association of Universities in Moscow which ended this week. Discussion concentrated on two topics: higher education and the problems of economic and social development, and universities and innovation. PAUL MOORMAN reports from Moscow.

## Universities everywhere being told what objectives to pursue

As they approached the twenty-first century, universities everywhere were more and more reflecting the ideologies of the societies of which they were a part. Mr Anastasios Christodoulou, secretary of the Open University and rapporteur for the group discussing economic and social development, told the closing session of the conference.

They were also, Mr Christodoulou said, increasingly having defined for themselves a set of common objectives, all of the objectives they had to pursue.



Mr Anastasios Christodoulou.

What linked all the participants at the conference was that they were engaged in analysing the role of their institutions in society, he said. All had a common interest in teaching to the highest levels and in the pursuit of knowledge through research.

Beyond that, however, "our diverse characteristics assert them-

selves and are at least as significant and meaningful as the similarities". Such diversities and differences, stemming from the various social, political and economic environments in which universities found themselves, strongly influenced the views expressed by many speakers, he said.

On whether universities had an important role to play in increasing social mobility, Mr Christodoulou said the point had been made that the pre-university educational system was in practice much more significant and, until that system guaranteed provision of equal opportunities for all, universities could in a sense only perpetuate a given set of social strata and consolidate an élite.

He emphasized that many Western European countries had tackled the comprehensiveization of their secondary schools long before they had attempted to reform their university systems. When they had later turned their attention to higher education, they had sometimes bypassed the universities and used more controllable institutions such as community colleges, polytechnics and colleges of higher education, as tools in the democratization of educational opportunity.

Mr Christodoulou said: "Many of us, particularly from Western Europe, are witnessing strong resistance from the universities to pressures being put upon them to shorten courses, introduce intermediate level qualifications, broaden the base at least of the first year or two of higher education and generally to diversify."

"Even capitalist social systems are trying of this so-called conservatism and are beginning to use the power of the purse to enforce change."

In some developing countries,

Mr Christodoulou, students were being given a key innovative role by being made to engage in community service.

He recalled the contribution of Professor Ungku Aziz, vice-chancellor of the University of Malaya, who had asked why all students should not have to take part in community service as an integral part of their courses.

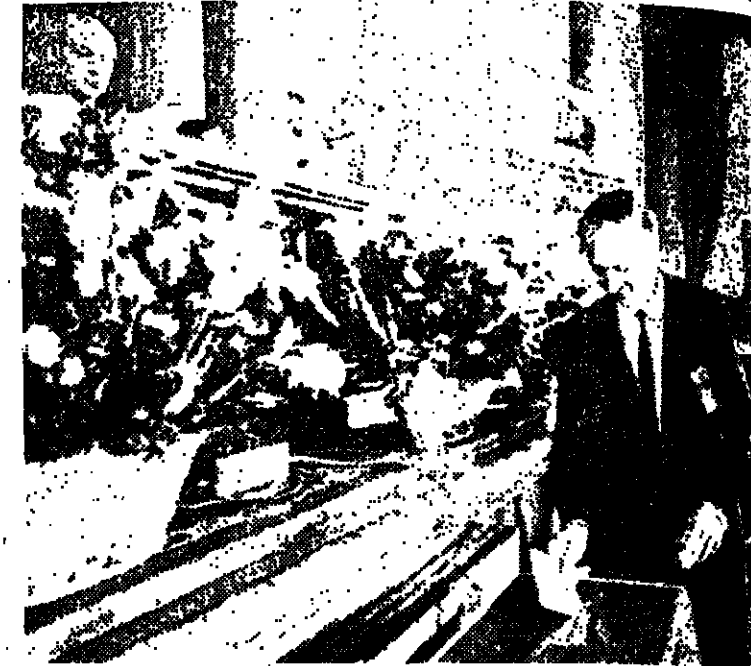
Professor Aziz had also asked why universities should not practise the self-sufficiency they were trying to preach to others by growing their own food.

Any reply that such activities would endanger scholarship had been dismissed as invalid by Professor Aziz, said Mr Christodoulou. Universities in developing ex-colonial countries, said Mr Christodoulou, inevitably had a very significant effect on social mobility, though in the short term only for the tiny minority which had emerged from an exclusive and limited secondary school system.

Whether in the longer term a country consolidated that minority as an élite or provided the whole of the population with equal opportunities depended on social policy, resources, political objectives, the improving sub-structure of the educational system and a whole of other factors.

In highly planned, socialist societies universities were more or less a tool geared to the production of relevant specialists to sustain rapid industrialization and production programmes.

Although they made special efforts to provide opportunities for working class students, they were extremely selective, and any success in social mobility would depend on the evolution of a competent and egalitarian pre-school and school system.



Dr Albert Sloman votes in the election for the new president of the IAU.

## Soviets' main task to build Communism 'Meritocracy largely an illusion'

The main task of Soviet universities in the next 25 years would be to educate specialists who would be directly and actively occupied in the building of Communism, Dr Ram Khokhlov, rector of Moscow University, told the conference.

Most urgent, he said, was to develop a system of continuous, lifelong learning so that graduates could always remain as useful to the state as when they first left college.

He emphasized, however, that any changes made in this direction would not be at the expense of the basic existing structures of higher education in the Soviet Union.

Dr Khokhlov said: "The principle of the planned training of specialists will be preserved; the system of higher education will continue to correspond to the structure of the national economy, specialists will be trained in accordance with already existing models and the period of training will be the same."

On lifelong learning Dr Khokhlov said that on-going retraining was already being carried out for academic staff and certain other specialists working in the national economy.

All university teachers had to attend a six-month extension course every five years. These courses were held in major higher education institutions throughout the country.

Moscow University was one of the centres and every year some 3,000 academics came there for "up-dating".

It was planned to extend this system to many more of the professions and specialists. Universities should provide similar teaching to the professions and specialists. The higher education institutions would have a key role to play in carrying out this project. Engineers would go to engineering faculties for retraining, teachers to colleges of education, doctors to medical schools, and so on.

Another crucial area of university involvement with the national economy which was certain to grow in the coming decades was in helping young workers continue their education.

"Now, when the transition to general secondary education is nearing completion, the forms and ways for young workers to continue their education should be developed and facilitated as much as possible."

Universities too often only responded to change when faced with crises or when pushed from outside. Dr Arthur Porter, vice-chancellor of the University of Sierra Leone, told the conference. But, he warned, unless they took the initiative in adapting to the changing world around them, they would find the status and function of other forms of tertiary education being upgraded.

Dr Porter said that although manpower considerations would continue to dominate in the next two

Higher education had shown its interest in democratizing itself, lessening the inheritance of privilege, Professor Martin Meyerson, president of the University of Brasilia, told the group discussing economic and social development.

The reason for this might be simply that the task was beyond the power of the universities, he said.

Inequality in access to higher education was largely a result of the inequalities at the secondary and primary levels. Only countries which had achieved universal primary and secondary education and in which the secondary education of the working classes preserved the option of higher education had lessened disparities between classes.

In one sense, Professor Meyerson said, meritocratic privilege based on the profession of equal opportunity was more efficient and made for more individual freedom than the meritocratic privilege based on the profession of equal opportunity.

But, he asked, was it in the end so different, depending as it did so much on factors to which we were born as surely as we are born into our class, sex and race?

One partial solution which Professor Meyerson discounted was that all institutions at the tertiary level should provide similar teaching to the professions and specialists.

"Homogenization does not do damage than good to individual potential and national needs," he said. "The great difference between the various goals of higher education: advancing knowledge, training individual intellect, training for individual success, reward, etc."

If quality, success, reward, etc. and individual initiative matter at all, then they must matter in higher education."

At the same time, Professor Meyerson said, universities should recognize that they served a social purpose—that they served a social purpose—that the problems of economic growth, environmental quality, inequalities of income and social justice were worthy problems for faculty and students to grapple with as the theoretical.

It was also necessary to recognize that potential students from various social and sub-cultural backgrounds faced widely in motivation and preparedness.

More closely within the framework of other categories of development. These were the success achieved by the universities in finding solutions to mounting problems of unemployment, malnutrition and income inequality.

To tackle these issues, social structures, course content, teaching methods, and administrative structures would all have to be altered, Dr Porter said.

Of all the external forces pressing on the universities, the developed and develop-

## Doctorate students face job shortage in US

Doctorate level students in the United States were facing major problems in getting the work for which they were qualified, Professor John Oswald, president of Pennsylvania State University, told the group discussing economic and social development.

About 32,000 PhD or Educational Doctor students were graduating every year. Worst hit were those with qualifications in the humanities and education. It was estimated that 85 per cent of all science and engineering doctorate graduates could still be absorbed into appropriate jobs.

The origins of the problems facing the rest were complex, said Professor Oswald. The continuing rapid expansion of higher education and research and development over the past 25 years had generated a continuous demand for scientists, engineers and teachers.

Enrolment in institutions of higher education had increased steadily from 2.5 million in 1950 to 12.5 million in 1970 and 13.3 million in 1975. National research and development costs increased from about \$14 billion in 1961 to about \$20 billion in 1975.

Professor Oswald said there was a tradition in the United States that teachers in colleges and universities should have a doctor's degree. Although this might not be an ideal situation, the fact remained that the quality of a college was often judged by the number of its staff having a doctorate degree.

In the period of expansion there was, therefore, a corresponding increase in the demand for PhDs. Equally, the expanding research and development programme eagerly took all the doctorate students it could.

But in the late 1960s it began to become clear that for demographic reasons the increases in enrolment in post-secondary education would begin to tail off and dry up completely by the 1980s. Science, too, ceased to expand in the universities in this period.

With the two major sources of demand for doctorate graduates levelling off simultaneously, employment opportunities were bound to be reduced. The situation, Professor Oswald said, was that the demand for doctorate education in the United States would have to change. There would have to be less emphasis on the production of professors for teaching and research. Instead, the tendency would probably be towards the production of more research-oriented academic staff.

Already, he said, the philosophy that universities should be free to establish as many PhD programmes as they could finance was being sharply questioned. Increasingly the state and federal governments were urging adjustments to more closely correspond with demand.

To accomplish this without introducing an unwelcome degree of governmental influence and control over universities would be very difficult.

Nor was the outlook good for those graduating this summer. With

time to construct a permanent, practical instrument for international intellectual cooperation at the highest level focused on the urgent problems of humanity.

Japan had been chosen as its headquarters because of the Japanese Government's pledge of 100 million dollars towards the setting up of an endowment fund. Senegal, Ghana and Sweden had also made contributions.

The goal of the endowment fund was 500 million dollars. Dr Hester said. The income from this would free UNU from the political constraints of government subsidies. However, still need contributions as well.

Dr Hester said: "We recognize that service to the developing world, where many of the problems with which we are concerned are most seriously manifested, is a major responsibility of UNU. And indeed the university's charter charges it with strengthening the intellectual resources of developing countries."

At the same time, Dr Hester said, it was intended to make UNU a source of reliable, unbiased information.

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## University College first in firsts

by David Walker

University College has supplanted Balliol at the top of the Oxford first class degree list, according to the results of the 1975 honour school examinations.

Balliol has not slipped far however since it is second in the list. The total percentage of firsts dropped to 11.7 from 12.6 per cent last year.

It has been a quiet year for the women's colleges. Somerville is top for firsts with nearly 15 per cent against university's 22 per cent. Overall the women took 1.7 per cent fewer firsts than men.

The women were redeemed in the tables which showed the combined results in terms of firsts and second class degrees. Overall they took 3.4 per cent more seconds than the men. Oxford, unlike Cambridge, does not divide its second class results. St Anne's repeats last year's performance in coming high in the lists of those colleges which do well. Last year it was first, this year second.

Under the system of classifying results devised by Sir Arthur Norrington, former president of Trinity College, the women's college fell down in the overall comparison. In this system a first scores three, a second two and a third one. The top women's college is Somerville at eighth with St Anne's and St Hilda's tenth equal.

The wooden spoon in the Norrington scale goes to St Edmund Hall with Lady Margaret Hall, women's college, and Trinity close at hand. Ortel, last year's bottom college, has pulled itself up to twenty-third.

University College with its 21 firsts comes out top of this table with Merton, always a front runner, second and Balliol third. Jesus College does well in fifth place, getting the fewest thirds of any college.

College	max points	pos	pos
University	196	279	70.3
Merton	129	189	69.2
Balliol	121	179	69.4
Jesus Christ	121	177	68.4
Jesus	120	249	68.3
Hertford	162	240	67.5
Wadham	160	237	67.3
Somerville	176	261	67.4
Queens	180	262	67.2
St Anne's	181	278	66.3
St Hilda's	179	270	66.3
New	205	309	66.3

## Woman president again disqualified

Miss Vivian Dinham has been disqualified as president of the Oxford Union for the second time. A fresh tribunal set up after a successful appeal against an earlier hearing has found her guilty of electoral malpractice.

The Oxford Union forbids canvassing before elections but Miss Dinham was said to have held a party for 150 people four days before the vote took place.

The first tribunal at the end of last term disqualified her from holding office shortly after she became the third woman in the history of the union to become president. But this decision was set aside at an appeal hearing when it was stated that Miss Dinham had been convicted under a different rule from the one under which she was charged.

A fresh tribunal hearing was ordered and last week it found she had broken the union rules. The presidency now passes to the election runner-up, Mr David Soskyn, of Magdalen College.

After hearing the news of his daughter's disqualification Mr Stanley Dinham, a railway truck engineer, used Oxford's "traditional set" for the ban. He said: "Vivian has been attacked because she is a Conservative although we are ordinary people, while those who have done this to her are Left-wingers from upper class homes."

Mr Dinham said that Vivian

## Banks fight for share of £75m student market

by Sue Reid

Britain's banks are battling for the lucrative student market. The 100,000 first-year students due this autumn with an estimated £75m in their pockets are potential clients the banks cannot afford to ignore.

The big four—Barclays, Midland, National Westminster and Lloyds—are trying to corner a share of the market and have launched a national publicity campaign.

Barclays has introduced a special cash card for full-time students in further education. Aimed primarily at first years it allows those with Barclays accounts but who do not qualify for a Barclaycard to cash cheques of up to £10 a day at any branch.

The bank, which claims to have cornered up to 33 per cent of the student market, has nothing but praise for its young clients. A spokesman said they often had a better banking record than other sections of the population.

Possibly to prove that point, Barclays has already extended its commission-free banking service for students to cover agreed overdrafts of up to £50. Its main competitors have not done this and seem unlikely to do so.

At the Midland Bank, a spokesman said that the "luring" of students was not their line. Instead they were offering students a guide to student life and a free map of their own educational centre.

National Westminster, with a claimed 25 to 30 per cent of the market, says they do not like gimmicks either, but offer a quality

banking service that understands student problems, said a spokesman. But they give pictorial cheque books, including some with scenes of university towns and campuses, free to students, while other customers have to pay a small charge for them. The bank admits that the banks do compete for student custom and, like others, the National Westminster offers a commission-free service to students if their account is in credit.

Lloyds Bank offer two pound vouchers to students opening an account with them. They say that the scheme, now in its third year, has proved to be very successful. They also say they understand the costs facing a new student and are trying to help.

The banks are, understandably, reluctant to admit how much they spend on the student publicity wars—and they seem to have got their percentage figures wrong since just three of them claim up to 95 per cent of the market. But underneath the stiff competition lies the assumption that once a student joins a bank he will be with them for life.

The National Union of Students also plays a part. They strongly advise students not to bank with Barclays because it claims the bank has South African investments. Students are recommended to open accounts with the Co-operative Wholesale Society and they admit that this preference is largely due to the society's trade union links.

But the Co-op does not make any special efforts to attract students and cannot say what percentage of the market it has captured.



Cheque overprinted with picture of New College, Oxford.

## Teach yourself Transatlantic

by Michael Binyon

Americans may hanker after the leisurely elegance of Oxbridge but do they actually know where this hybrid is or what goes on there? What is the aspiring postgraduate to make of proctors and JCRs, readers and moral tutors, not to mention students reading Grate?

A handy little booklet from the publishers of Education will make it all clear. The American's Guide to British Education has all these terms in its glossary of 200 of the more obscure but frequently used terms of educational jargon.

A short sentence covers such entry. For example, Tripos is "the final honours examination for the BA degree at Cambridge"; a reader is defined as an associate professor; while a Wrangler is a Cambridge mathematics graduate who has achieved first class honours; no connexion with horses? And so on.

But not only Oxbridge can baffle. Public and preparatory schools have their own secret language: matron, prefect, HMC General school terms, such as periods, forms, leads, assemblies, old boys and girls are also explained.

Some familiar names which have slipped into educational shorthand

are defined in full: Crowther, Plover, Bullock, Newson and Robbins. Judicious selection of the ubiquitous initials are also explained: UCCA, UGC, NAS, NUT, GCE, ITC, HND, CNA, and so on.

If the booklet is turned upside down and back to front there is an equivalent list of common American terms. Some false friends immediately beckon: ACE (American Council on Education), announcements (prospects), dormitory (hall of residence or hostel), faculty (teaching staff of a school or college), prep school (prepaying school like an English public school) and finally, catch, public school (maintained school).

Latin terms in educational usage—fraternity, alumnus, salutatorian, valedictorian—are listed alongside the more vivid Anglo-Saxon: buddy system ("sitting next to Nellie"), retreat programme (refresher course), moonlighting (taking a second paid job), headstart (pre-school education for disadvantaged children).

The booklet does not claim to be exhaustive. The author, Catherine Aven, is a careers guidance inspector with the inner London Education Authority. It is available from Councils and Education Press Ltd, 10, Queen Anne Street, London W1M 9LD.

## Business studies LSE's most popular

Business studies were the most popular subjects for graduates at the London School of Economics last year, according to recent figures.

At the LSE, where postgraduates were over 48 per cent of the total student entry in 1974-5, nearly five students applied for every place in accounting and finance and four students for every place in management studies. Other popular graduate subjects were psychology

subjects were as popular in 1974 as they were in 1970, although the ratio of students to the numbers of places in social administration has increased. More students applied successfully last year in sociology, history and social psychology than four years ago.

Total entry to the LSE has increased by about 200 since 1970 with the proportion of undergraduates to postgraduates staying roughly the same. Last year there







## The Open University takes its advice and equipment overseas. Frances Gibb reports

### 'You cannot remain isolated'

The Open University is fast becoming one of Britain's main exports. Now securely established in Britain, it can afford to turn its sights abroad and OU expertise, in software and hardware is increasingly in demand in countries ranging from the United States to Pakistan and from Israel to Nigeria.

Expertise is being demanded in two forms. First, in the form of advice on distant learning systems which can be applied not only to undergraduate situations but also to secondary schooling or vocational training. Second, in the form of the course materials themselves: books, cassettes and films.

The second is part of the OU's remit, since it has an obligation to the Department of Education and Science to try to obtain income from foreign markets, in order to lessen the university's burden on the taxpayer. Offering advice, however, is undertaken as a non-profit making activity, and it is not officially part of the OU's work. Yet as the market flourishes, its need is increasing.

The turnover from marketing materials has grown from £92,924 in 1971 to £481,000 last year. The surplus on last year's turnover was, however, only £16,000, due largely to the local difficulties caused by local government reorganization and the economic climate. This year it is expected to improve.

Exports now account for about 65 per cent of the total turnover. OU materials are selling all over the world with Australia as one of the best markets, followed by Holland, Germany, and Scandinavia. As well as America, the OU has agents in the United States, South East Asia, Africa, and there have even been small sales in Eastern Europe and the Soviet Union.

Although sales have been high in Iran, the potential of other oil-producing countries has not yet been fully developed. An OU agent will be going out to Saudi Arabia for the first time in the autumn.

The OU markets 16mm films of all its joint OU/BBC television productions and more than half of the overseas sales are from these. In Britain, however, the bulk of the turnover is on books. Films are usually hired rather than bought, and cassettes, although selling well—particularly to college libraries—make little profit.

One area within the overseas market which has a great potential is that of translations. Already, books are published in Spanish, Italian, Dutch, and Danish and it is hoped that more languages will soon be included.

Mr John Cox, sales manager at the OU, says that the Spanish language market, where 56 OU titles have now been translated, is one of the most exciting. "The interesting thing about this market is the huge number of students in Latin American universities," he says. "For instance, in Mexico City, where the population is about 8m, there are three major higher education institutions, with a total of about 450,000 students. This is in one city, in one country, and it is repeated throughout South America."

Apart from providing money for OU, what other advantages does this marketing have? "Selling material on a commercial basis is an efficient way of distributing our material," Mr Cox says. "Due to us,

2-3m OU course books are being used in different parts of the world and the fact that they sell well is due to our academics. So there is this spin-off—that our reputation is enhanced by making the material readily available."

Marketing is firmly established, but it has brought problems and it was marketing that led to the establishment of the Open University Consultancy Service, the other arm of the OU's exports.

The OUCS has sprung from the need to answer academic problems arising from sales in the United States but, although marketing and consultancy remain separate, it is the profits from marketing that enable the OUCS to operate at all.

It was clear that the United States could be used in the United States. Professor Michael Neil, director of the OUCS and professor of educational technology at the OU, "So here was a practicable marketing proposition: OU materials could be bought for a fraction of their production costs, which is between £350,000 and £600,000 for one full length course. There was also United States expertise which we could buy at a fraction of production costs, so it would work both ways."

Research at three American universities proved that the use of OU materials was quite successful, but the marketing agency could not cope with the large number of academic questions arising. The North American OUCS was set up under Dr Barry Shorthouse, formerly a regional staff tutor. Its functions range from the simplest public relations work between universities and the provision of a ready point of reference for inquiries to negotiations over the production of independent learning materials which would combine United States capital with OU expertise.

The OUCS main office at Milton Keynes was established on an experimental basis nine months ago. Professor Neil says it has an international responsibility to respond to the demand for advice on distant teaching systems. "You can't remain in isolation. You have to respond to the best of your ability," he says. But like the American office it operates on a shoestring budget, with a minimal staff and no external grants. Whether it will stay after 1977 will depend on whether it is doing a demonstrably useful job for the OU—and is paying for itself.

Its services are offered to governments, agencies, or individual institutions which are considering open learning systems. Advice might be on the management of such systems, on the design of materials or on how to distribute them. The time involved may range from a day spent with an OU representative, to a project lasting several months and carried out by teams working in distant countries, and whose staff would also be available for consultancy work.

As a separate company, but as a part of the OU, the OUCS would be able to find the sort of formula which makes it obvious to the major universities that this is one very significant way in which we can give specific help of a kind that no other agency can give, and which is in high demand.

If they do not get the money, Professor Neil sees two ways of keeping OUCS forming a new department within the OU: research and development distance learning, and whose staff would also be available for consultancy work.

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This has always been the situation, and hence there is a certain fatality about those who are exceptionally

inspired by the OU and a feasibility study carried out by the OUCS recommended that the British Council set up a "comprehensive scheme of collaboration" between the People's University and the OU over the next two years. So far, however, not much has been undertaken because of limited funds.

Much of the OUCS work is in collaboration with the British Council; for instance, the feasibility study on the People's University was undertaken at the Council's request. At present, the OUCS is negotiating to become a member institution of the Paid Educational Services unit, because, as Professor Neil says, "We are necessarily one of the main assets this country has."

PES involvement does provide a problem for the OUCS. Income from PES countries provides one way of helping OUCS work with poor developing countries, but there are fewer PES countries than developing ones and the money will only go so far.

Still, the potential for consultancy work is vast and largely untapped. It has already spread to Europe and to Africa, where Nigeria, Kenya and Tanzania are all interested in many education systems.

But while the marketing is successful, the consultancy is limited by its budget. "Without some funds of a substantial kind, we could not continue in the PES area, which is not always when help is most urgently needed. We have simply no resources of our own which can be justified as diverting to this purpose," says Professor Neil.

Negotiations are currently taking place between the vice-chancellor of the OU and the Ministry of Overseas Development for pump-priming grants for the consultancy service. "They treat the matter seriously but without any signs of urgency. The fact remains that the OU is not going to continue to support the consultancy service without external support."

The amount the OUCS is asking for is under £100,000 a year, which is the amount needed for some of the aid programmes to poor countries. The money would not ensure that the money would not go to all rich PES countries. The OU does not want to subsidize what can be fully paid for, he says.

But it is difficult to separate expertise and resources that are used for PES and other countries. "There's got to be a modus vivendi between the two, while at the same time giving a specific assurance that funds will not be used for PES," says Professor Neil.

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## Don's diary

### Cyclical depression

Reading some recent diaries, I was initially surprised at the number of contributors who allegedly write from the interior of an aeroplane bound for exotic destinations; now I find myself beginning to wonder if the rather less excitingly bound but perhaps similarly cocoon-like environment of a train bound from Kings Cross to Leeds.

It seems, unfortunately, that periods of two or three hours totally free from distraction are increasingly hard to come by and, were it not for the lack of cooperation on the part of British Rail in continually raising their charges, the day return to London would be a "good buy" for university staff.

After a day at a scientific meeting, whose interludes were filled with exchanges of horror stories of gloom and doom, at the home universities of the participants, I fell to wondering whether this is a uniquely difficult time to be alive in a university or whether my tutors and professors of nearly 20 years ago, in spite of the brave faces they invariably turned towards their students, had similarly depressed private conversations.

Attempting to recover some objectivity, I recognize that the whole thing must be cyclical, but even so, an objective place I have serious fears that the amplitude of the oscillation, tied in some complex way to the economic fluctuations, is increasing while the period is decreasing, and as a well-trained applied mathematician I look anxiously for the "non-linear effect" that will inevitably modify the process.

The basic characteristic of a non-linear process is, of course, that a small change in some cause or input produces a quite disproportionately large change in effect or output, the difficulty lies in spotting which small change in input will be critical, and in what way.

That the influences comprising the critical inputs had not been spotted by the planners of yesterday was made clear to me when clearing out, later in the week, some of the accumulated paper which, to the point of overwhelming me, any room I occupy for more than a year or so, either in the university, or at home.

I chanced to notice in the outgoing rubbish a draft of the submission to the University Grants Committee for the quinquennium 1972-1977, dated June, 1971. One thing its pages and reading its phrases,

I realized that here was a remarkable find indeed, and one which perhaps should be required reading for the present generation of planners for the next quinquennium.

It amazes me to rediscover the way in which we (because I was certainly a party to it, notes and alterations in my own unmistakably illegible writing are still there) just four short years ago, "anticipated a major increase in both single subject and combined studies students" in a department whose intake has since halved, or "expected a considerable expansion of applications" or "expected a rapid expansion in student numbers", or will double the number of students in departments which have faded only slightly better.

Certainly an expectation of a roughly linear response to applied policies led us in that document to forecast a continued growth more or less in line with the past five years or so, but clearly influences beyond our comprehension were already at work which, within two years, had rendered our plans (at least in the science area) totally unreal.

### Working men

Incidentally, I remember reading recently in the paper that the number of British men going up to university actually fell by 7 per cent between 1972 and 1973. It is interesting to find this supporting evidence to my discovery some months ago, surprising both to me and to many others it seemed, that the number of British men entering Leeds University as undergraduates was actually smaller in 1974 than in 1968, despite the large overall expansion over that period, which apparently came from women and foreign students.

Surely there is a fertile field for some sociological study here—were we not assured in the late 1960s of the tendency for a larger and larger proportion of the relevant age group to come to university? Perhaps there is a growing trend for British men to spend a year or two away from full time education between school and university. Such a trend, would, of course, reduce the number of British men entering university, but it would also, and consequently cause a more rapid increase.

Unfortunately I don't see any evidence of such a trend. I say unfortunately because, in my experience of perhaps a dozen such "mature" students, my strong impression has been that they both

gained from and contributed to university life rather more than the average student straight up from school. Their motivation was clearer and their ability to organize their life efficiently was greater, though this is doubtless to be expected of a man or woman who chooses to come to university after a period in a job; after a year or two of reasonable income it takes a certain amount of courage to revert to student grant standards.

### Exercise in futility?

Unhappily it seems to me that the critical influences mentioned earlier have still to be positively identified. What is it that without warning causes the number of applications to a major department with a record of many years of success and good public relations to fall by a third in a single year? What is the perhaps trivial and at first sight irrelevant point that finally decides a candidate to accept rather than decline an offer, to make one university first-choice rather than another, or even to apply to a number of universities at all?

In the absence of answers to these and many similar questions the six or more years ahead seems nothing more than an exercise in futility: an exercise which, by chance, we went through in senate in great length only a week or two ago.

What then are we to do? Clearly the primary requirement is a plan flexible enough to embody the ability to cope with substantial variations in the balance of student numbers both between the several faculties and between the subject areas within those faculties. If the science of statistics is to be believed at all, surely the degree of uncertainty in the total number will be less than the degree of uncertainty in each of its individual subject contents and losses on the swings and gains on the roundabouts will be balanced by gains on the roundabouts. But here we hit a gross contradiction: the rigidity of university staffing structures.

Virtually all university teachers have tenure and most chemists are quite remarkably bad at teaching history (or so I would suspect) and vice versa, so it seems impossible for an individual university, or even all universities together, since trends seem to be on a national basis, to adequately accommodate the scale of fluctuations we are experiencing. We have a structure which is splendid in times of steady expansion, and just tolerable in times of static numbers or even contraction. It is very inefficient in times of decline and therefore unsuited to the handling of a cyclically varying student intake, even if the oscillations take place about a slowly rising mean.

One way of easing the difficulty



would be to encourage a greater amount of personal movement between the university teaching profession and other fields of work, other forms of teaching or research perhaps, but not necessarily so narrowly confined.

At present the typical university teacher spends virtually his whole life in the profession; I suspect that many individuals would welcome a spell of change, but only the very brave actually take the plunge because they fear the risk of loss of status and seniority on their return, if indeed they are ever able to return, to the university world.

With a relaxation of this rigid boundary between university teaching and other jobs, an inflow or outflow, as appropriate, of university teachers would become possible. Of course a framework within which an individual could move without loss or diminution of his own personal security and prospects would be necessary.

In many cases there is no doubt that the temporarily superfluous university teacher could be very valuable elsewhere. For example, an undoubted reason for one of our present problems, the shortfall of potential science undergraduates, is the shortage of properly qualified teachers in schools. In this respect mathematics is perhaps the subject worst affected.

### Leaving the fold

I have it from a "usually reliable source" to recall a delightful BBC phrase, that the number of maths graduates teaching in our secondary schools is probably less than half the number of schools and, more generally, the areas of deficiency in schools are those of superfluity in universities. Surely some form of part time involvement in such problem areas of school teaching, or even temporary secondment, is not altogether impossible. In many cases both the school and the individual university teacher would gain.

I recognize, even from that distant viewpoint afforded by governorship of a school, that we in universities are inclined to lose sight of schools' problems, and a little closer contact might be salutary even though the difficulties of organization might be considerable. There is also the possibility, often discussed in the past and occurring in a few individual cases, but not extensively developed as far as I know, of transfer, secondment, part time work, regular consulting between universities and government establishments, or private industry and commerce. Again the organizational difficulties are always said to be great but if the demand for higher education really turns out to be cyclical and largely unpredictable, surely some machinery for such interchange could be established, and it would be clearly recognized by the prospective university teacher that, during his lifetime, he would very likely spend several periods outside the university sector.

The details of such arrangements would need careful planning, and one would wish that an individual's own preferences could be met, but there is a good chance that the number of people anxious for a change and challenge would be adequate to ease the problem. After all, any change of job, even between universities, at least on the science side, is becoming very difficult.

If the machinery for freedom of movement into and out of university teaching were available and such movement from time to time were to come to be accepted as normal, then a cyclical behaviour in numbers entering university disciplines could be accommodated, the average staff establishment, as it were, tunnelling through peaks and bridging the troughs of student numbers, the actual staff being increased by any one time being increased by any inflow from other forms of education and elsewhere at peak periods and decreased by not outflow at trough periods, thus permitting the intense pressures at present set up within the rigidly bound university teaching profession to be dispersed throughout a much larger reservoir of relevant expertise and experience.

Perhaps this idea is just summer daydreaming and not a workable policy—it is certainly not an original idea, but in exploring possibilities for improvement of our use of university resources, particularly the most valuable resource, the university teachers themselves, we must not only learn to live with the number of schools and, more generally, the areas of deficiency in schools are those of superfluity in universities. Surely some form of part time involvement in such problem areas of school teaching, or even temporary secondment, is not altogether impossible. In many cases both the school and the individual university teacher would gain.

John Brindley

Dr Brindley is senior lecturer in the School of Mathematics, Leeds University.

## Depth rather than breadth



KENNETH MINOGUE

What should an undergraduate learn at a university? The only immediate answer to this question is more than he possibly can in the three years allocated for most first degrees.

On the other hand, the solution to the problem posed in this fashion is not to increase the length of a course beyond the number of years currently allowed. For all that a university degree can do is turn a student's mind towards the problems involved in a certain discipline and the remainder of his education will be the course of his life.

This has always been the situation, and hence there is a certain fatality about those who are exceptionally

current knowledge, and imagine that the present time is unique in creating a demand that professionals should have constant refresher courses. Education was never a once and for all exercise, and it is not now.

The way in which this problem is commonly formulated is in terms of breadth and depth, a formulation which at least has the advantage of showing that it is an economic problem of dealing with time as a scarce resource, and that it is in principle insoluble. For it is obvious that depth must be had at the expense of breadth, and vice versa.

Those who argue for breadth are commonly motivated by the amount of information they think a person needs in order to come to terms with the modern world. In principle, there is no limit to what one might need to know. Geography and languages for travel. Elementary principles of mechanics when faced with a motor car engine or a defective dish-washer. The national heritage in order to have some sense of communal identity. Poetry and literature in order to be a whole man.

A smattering of information about Asia and Africa in order not to be perched. Some history of science in order to understand the workings of a modern technical civilization. A little philosophy to knit everything else together, and to defend against bad reasoning, and

political systems in order that students should turn into good citizens.

And where would we be in a cocktail party could we not pick up a reference to Freud, Marx, Beckett, Kafka and the rest? The list is obviously endless, and to be "educated" in it would be to turn us into amateur polymaths. Such a field of knowledgeability would be hopelessly corrupting. It is clear that one of the major assets of an educated man is a firm grip on his own ignorance, and that ignorance is one of the major desiderabilia of any educational programme.

Indeed, for those who seek this kind of conversational competence, there do exist institutions which will be helpful. They are, of course, schools and universities, but rather newspapers and journals, which operate very efficiently as liaison officers between the various disciplines and the parts of the world at large.

The answer, then, to those educational imperialists who want to turn the world into a school, and who believe that grandiosity must not be the end of education is that it is not, and it could never be. Anyone with alert ears and eyes goes on learning throughout his life, just as he learns a great deal when out of formal schooling. It is a mistake to identify education with learning which is a much wider type of experience.

The real characteristic of education, by contrast, is depth: it is the only thing that can be achieved once we have abandoned the self-defeat

One of the features of depth is that it is not merely an acquisition of a great quantity of information, but the turning of character in such a direction that henceforth being a mathematician, a classicist or an historian becomes an inseparable part of the character of the person concerned.

Another crucial feature of depth of understanding in a particular subject is a degree of application which leads its practitioners to be impatient of journalistic or survey accounts of the subject. For no one who really knows anything about a subject can read textbooks without frequently making reservations about incautious generalizations, or reflecting that such and such a popular account is not quite how it is. To be properly educated in a subject is a form of connoisseurship.

Further, its effects are usually not limited to the particular subject in which the connoisseurship has been acquired. To go deeply into anything will, in principle, acquaint a person with a sense of the depth and complexity of things that will carry over into all areas of life.

For this reason, grave suspicion must attach to anything in elementary education (say, up to graduate level) which is recommended in terms of the word "interdisciplinary".

What it must look like if seen in terms of the conflict between breadth and depth is a way of resuscitating the notion that education is nothing else but (what it must be at the beginning) the acquisition of

To study, for example, French literature, is a way of becoming adept in the disciplines of literature. But there is a certain attraction in qualifying this study interdisciplinarily by tossing in bits of the geography, history and economic structure of France, not to mention the French film and the racy argot of the *Boul Mich*. It looks like an advance, but it must necessarily be done at the expense of the literature and language from which the study began.

Toss in enough of these indispensable disciplines and education does indeed collapse back into the status of mere acquisition of information—the business of newspapers and journals.

Interdisciplinary studies in universities are the direct descendants of the delusory lure of the problem-oriented "project" in education as carried on in schools: no doubt fascinating, and exciting at a diversion from what must often seem like the hard grind of chemical tables and trigonometric relations. Possibly indeed more manageable than the standard induction into a discipline; but not, fundamentally, more transforming.

In the end, nothing is worth doing educationally unless it is done thoroughly, and smatterings and glots (like surveys and back-ground) are, except for limited purposes of induction, educationally a waste of time. But for many of the practical activities of life, of course, smatterings are



David Walker on how Cambridge still attracts the traditional type of entrant.

## Public schools and professional backgrounds

Cambridge University still attracts most of its students from public and direct grant schools, and they tend to come from professional and administrative homes in London and the south-east, according to the preliminary figures for entry this October, which were released last week.

Of the 40 per cent of male students who get a place at Cambridge through the colleges examination rather than A level results, nearly three-quarters come from public and direct grant schools. For women, the public and direct grant schools make up 26 per cent of those putting their name up for Cambridge entrance, but provide 35 per cent of the successful candidates. The similar figures for men are 19 and 25 per cent.

Traditional patterns still show at A level. The examining board generally associated with the public schools—Oxford and Cambridge—examined over 40 per cent of the men accepted for Cambridge, against only 12 per cent of the total A-level candidates in 1973. By comparison, the Joint Matriculation Board examined 19 per cent of Cambridge applicants this year, and 19 per cent of total A-level candidates two years ago.

Recent figures for the students who came to Cambridge in 1971 showed that the public schools took most of the awards offered by colleges. Public school students took nearly 50 per cent of the scholarships and 44 per cent of the exhibitions against 26 per cent of both awards for the state schools. This year, according to the figures for offers made to candidates, the state schools provide 42 per cent of those accepted for Cambridge (some 1,032 students), against 50 per cent for the public and direct grant schools. These figures compare closely with the average for 1970-74, with little change.

This allows comparison with the figures for A-level results available for students coming in 1971. State school students by and large got at least two A grades at A-level, with nearly 80 per cent getting an average of at least two A's and a C grade. Nearly 50 per cent of direct grant students, who this year number 448, got three A grades in 1971. For the public schools this figure was 30 per cent.

Of the 1971 generation the direct grant students were the best performers in the tripos examinations. The Cambridge system divides the examinations into two parts, both of which are classified with no necessary correlation between a result in one part and another. The direct grant students did best in parts one and two, with over 13 per cent of them getting firsts and 25 per cent upper seconds in part one.

The state school students got slightly fewer firsts in both parts—proportionately. About 12.8 per cent of them got firsts in both parts, and 22.2 per cent got 2:1 in part one. Just over 9 per cent of the public school boys got firsts.

The figures also show how far the

that a student eventually does well. In fact they show that only 43.3 per cent of the scholars got firsts in part one; 20 per cent got 2:2s and thirds. In part two this figure decreased, which is surprising since some colleges make the continuance of a scholarship conditional upon a student's success in the tripos examinations. In part two, 32 per cent of the scholars, 13 per cent of the exhibitors, and just over 8 per cent of the rest, got first class degrees.

The figures show clearly that Cambridge does remain exceptional as regards the background of its students. A sample taken by the Universities Central Council on Admissions in 1972 showed that of the total number of university candidates that year, 20 per cent were from private education. The same proportion for Cambridge this year is 44 per cent.

Of Cambridge entrants this year, 65 per cent have parents in administration and management, or professional and technical. An UCCA sample of 1973 showed that only 46 per cent of the total number of university entrants were from the same classes. In the total number of economically active males between 45 and 59 in Great Britain at large this proportion shrinks to 14 per cent.

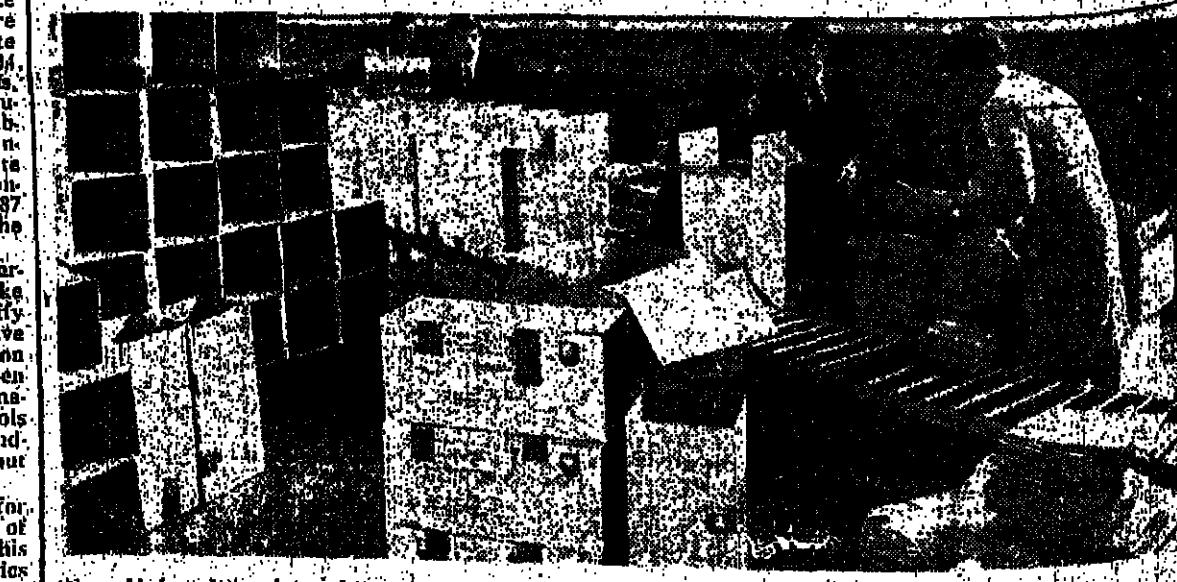
Nearly half the Cambridge men accepted this year are in the three A grades at A level bracket. An UCCA sample in 1974 showed only 8 per cent of all university candidates had at least three A grades and 14 per cent had two A's and a B grade. For women the proportions are similar.

The geographical bias in Cambridge's catchment area is striking. Ten per cent of all sixth formers live in Yorkshire and Humberside; only 4 per cent of Cambridge's new students come from the region. Nearly 22 per cent of sixth formers live in the South East outside London, yet they make up 32 per cent of those accepted by Cambridge.

The results of the Cambridge Joint Examination, the entrance examination run by the colleges, are also interesting. Although the state and other schools prepared 1,894 candidates for these examinations, the public schools, 1,260 students, more than twice as many public school pupils were unconditionally accepted. About 240 state school pupils were accepted unconditionally this year against 487 pupils from public schools on the results of the joint examination.

For women the position is different. Almost all women have to take the college examinations to qualify for entry and this year none have been accepted unconditionally. A level results. Far more women candidates in the college examination come from the state schools than the direct grant and independent schools, by a ratio of about two to one.

The least popular faculties for men according to the number of applications per available place this year are classics and mathematics.





## American news

Alison Wolf looks at the claims of vocational schools to provide college education—and a job afterwards

### Concern grows over loan abuses

The beautiful white-coated people smile out from the advertisements: "You don't have to go to college to have a college career. Enrol with us." Vocational education is big business in America, and profit-making schools account for a very large part of it. While the tax-supported public schools enrol one million students a year, the more flexible private schools enrol over three million students and earn over \$2.5 billion a year.

The schools operate under three controls: the Federal Trade Commission, the Veterans' Administration, and the Office of Education. Most states have their own rules, and the independent accrediting associations can grant or withhold their approval.

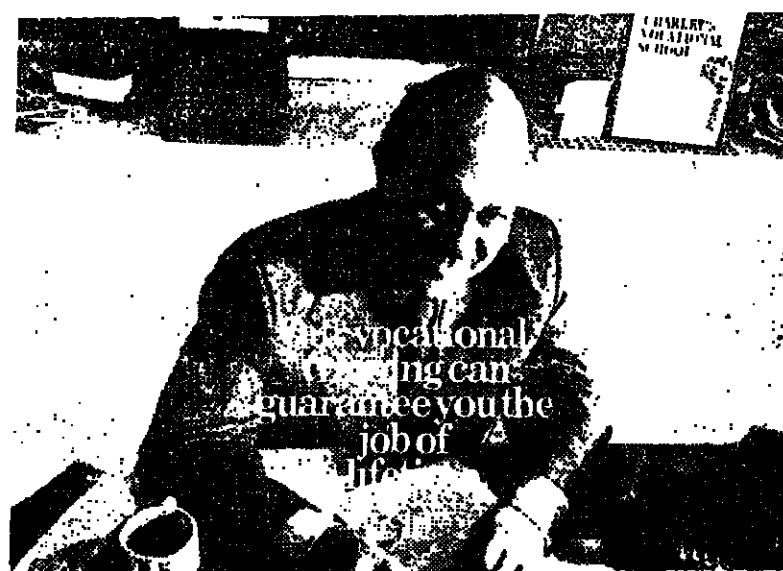
In spite of this, a recent series of scandals have led to congressional hearings and proposed new regulations. The Veterans' Administration will now give refunds to private vocational schools who enrol veterans with federal benefits. And the Office of Education has new rules for public and private schools which take students who have federal loans.

Also due out soon is a new Federal Trade Commission regulation which will involve a refund policy, information on dropout and job placement rates, substantiation of employment and earnings claims, and a 10-day cooling-off period after enrolment.

Existing controls stem from the postwar period, when the GI Bill provided \$14.5 billion for the education of veterans and states had to disqualify over 5,000 schools in two years. These rules are inadequate for present abuses for students.

But millions of dollars of federal taxpayers' money are now tied up in proprietary vocational schools through The Veterans' Administration, the Social Security Administration, or through student loans.

Under the guaranteed student loan program, students are encouraged to sign loan notes for their full tuition immediately instead of by the quarter, and some schools



Cover of booklet warning of pitfalls in some training offers.

adopted high-pressure sales techniques. Others over-extended themselves and Advance Schools of Chicago, one of the nation's largest correspondence schools, went bankrupt this summer when the Office of Education ruled that loan notes could not be traded.

In some cases students had signed loan notes for as much as \$1,500 without realizing what they were doing and many students had to pay even after they dropped out. Sometimes they refused, leaving banks and credit unions holding worthless loan papers which the federal tax payer had to pay. The dramatic press exposés which preceded the congressional hearings concluded that the federal agencies had more of the supervisory powers they needed but were not making use of them.

The Office of Education, for example, was attacked for its "past mismanagement" of a loan programme which witnesses called "a monument to administrative immobility".

The Veterans' Administration explained that they had contracted with 72 state agencies to approve

and supervise these schools. And the Federal Trade Commission was attacked for not cooperating with state agencies.

The congressional report duly recommended that the FTC shared information with the states, and stressed the need for better communication among relevant agencies and an end to the situation where one agency aids a school which another knows to be operating illegally or to be in danger of collapse.

But perhaps the greatest significance is for the rest of higher education. Representative James O'Hara, Chairman of the House of Representatives Subcommittee which handles Higher Education bill now before congress regulations for proprietary schools, but has applied them to all colleges receiving federal funds.

Every higher education institution would be obliged to establish a "fair and equitable" refund policy, to provide full information on faculty qualifications, and employment claims.

## India

### UGC initiates campaign to raise standards

from A. S. Abraham

**BOMBAY**  
The University Grants Commission, which has in the past been accused of allowing higher educational standards to deteriorate by not using its regulatory powers, has announced a series of "guidelines" to control the expansion and improve the quality of higher education.

It has laid down norms which colleges will have to meet before they can start postgraduate courses. Teachers on their staff without a master's degree or any equivalent research or published work will have to get a degree within five years. No college will be able to start a course unless it shows consistently good results at the undergraduate level, unless the demand for a particular course is persistent and unless the enrolment of an unspecified "minimum number of students" is guaranteed.

Any course a college wishes to start must be "invariably linked with the manpower needs of the region", the college must have enough staff, books and equipment, and it must finance the participation of teachers at national conferences on the subjects.

Teachers in the humanities and the social sciences will be required to get a postgraduate degree or diploma in research methodology and their workload should not exceed 12 lectures a week so that they can keep abreast of the latest developments in their field.

The commission has also asked

universities to "strengthen" the correspondence courses they offer. The "guidelines" here are said to be part of the general policy at all levels of education to emphasize non-formal instruction.

At present, 11 universities with a total enrolment of about 60,000 students have correspondence courses leading to the bachelor's and master's degrees in arts, commerce and education.

The commission has stipulated that, as a rule, only one university in a state can offer correspondence courses, unless a second one proposes to start a course in an undergraduate faculty for which there is no regular undergraduate provision anywhere in the state. Alternatively, a second university in the same state can begin a correspondence course if the enrolment in the first has reached the "optimum" size of 10,000 students.

At the postgraduate level, correspondence courses can be offered only if universities have "well-established teaching departments noted for their high standards" and if they have been running undergraduate correspondence courses for at least three years.

Finally, the UGC is to spend £250,000 during the year on setting up "book banks". These banks loan books, chiefly textbooks, to students who cannot afford to buy them. In a country where the price of a standard work, especially in medicine or engineering, can sometimes amount to a whole term's fees, an official book bank could be of tremendous value.

## West Germany

### Court upholds protest over PhD assessment

by Günther Kloss

In Britain academic and administrative decisions of colleges are seldom challenged in the courts. In West Germany, on the other hand, where there exists a long tradition of state supervision and regulation of university affairs, administrative courts have in recent years had to deal with a large number of cases relating to almost every aspect of higher education.

The complex issue of admission to institutions of higher education (THES, July 18) is a relatively recent addition to the areas into which the judicial process has been brought. Examination results, too, can be challenged and now even the method of final assessment of PhD degrees has been legally challenged.

In this case in the Wiesbaden Administrative Court. The plaintiff, who was awarded his PhD in law in August 1973 argued that the overall mark given to him for his performance in his doctoral examination, which consisted of a thesis and an oral examination in seven subjects ranging from classical ecclesiastical law, should have been higher than a "pass".

At issue was not the assessment by the individual examiners but the method by which the individual subject marks are averaged out to arrive at a total final grade. PhD regulations of the university

and two decisions of the faculty of law, dating back to 1956 and 1957, lay down that it is impossible for a candidate to attain more than a mere pass grade if he failed in one of the subjects of the oral examination. This the post-graduate student bringing the action had done, although both assessors of his written doctoral thesis had given the highest mark possible, *summa cum laude*.

The administrative court accepted the student's point of view, arguing that the university's decision would violate general legal principles because the desired purpose and the means chosen to achieve that purpose must be in a proper relationship.

The court recognized that an examiner's decision is necessarily subjective. It held that examiners are in general not obliged to arrive at the total final mark by purely mathematical operations. They have the freedom to introduce other relevant considerations, especially the overall impression made by the candidate.

The student's performance will now have to be reassessed and he will certainly be awarded a better overall mark. The case will also oblige many universities to reconsider the practice of awarding grades for PhD examinations.

## Italy

### Managers' institute 'must change'

from Patricia Clough

**ROME**  
The International Institute for the Management of Technology in Milan must make some fundamental changes if it is to stay open, the governing board has been told.

The board has set up a study committee to study the institute's future role proposed that its present objective—a high-level educational body should be abandoned. They have suggested various alternatives, including its transformation into a research centre for the IEEC.

The board has instructed the acting director, Mr. John Nisbet, to consult member governments, international organizations and associated institutes. He will report to the institute's council by mid-October.

The institute's activities were

after only a few months—because of severe financial difficulties, its budget was not geared to spiralling costs, and its courses had failed to attract sufficient participants and an adequate income.

The institute was set up, by Britain, West Germany, the Netherlands, Austria, Italy and France, and a number of big European industries, after a proposal by the Organisation for Economic Co-operation and Development (OECD). Its purpose was to provide courses on administration and technology for industrial executives, civil servants and local authority officials.

But the committee says that there is now little demand for the institute's services. Business schools have developed all over Europe, offering research courses and seminars for high-level personnel, and the institute could not compete.

The Third International Conference on Higher Education begins next week at Lancaster University:



Martin Trow, professor of sociology in the Graduate School of Public Policy, University of California, Berkeley, and one of the main speakers at the conference, discusses the implications of low growth rates, and their impact on American higher education.

Serious students of higher education see quite sharply differing futures, at least in the important realm of student enrolment. There seems to be some agreement, for what it is worth, that overall enrolments will continue to rise for the next few years, but rather more slowly than they did during the sixties; one prediction has the United States reaching about 10 million full-time equivalent students in 1980, when these numbers are expected to level off and even show a slight decline in the mid-decade.

For the 1990s, however, predictions vary from a student growth of 30 per cent over 1974 figures to a decline of 30 per cent, and there is more than one observer making each of these high and low predictions. Such is the state of the art of higher educational growth forecasting.

We could not predict 1974 very well in 1971. We cannot predict 1984 very well in 1974. But we think we can explain in 1975 why our 1971 predictions were not so good. We are really much better at retrospective analysis (though it is perhaps not necessary to go into an explanation just now).

Nevertheless, in spite of all these warnings and qualifications, it seems clear that American higher education is now undergoing a major change from its historical pattern of growth. Over the 100 years between 1870 and 1970, enrolment in American higher education doubled every 34 to 35 years; in only four years during that century, two of them during war, there was an absolute decline in the numbers of students enrolled in higher education.

During the decade of the 1960s growth accelerated, even over this long-term average, doubling within that 10 years, from 3.6 to 7.5 million degree-credit students. But growth rates are surely slowing now. In retrospect the turning point in college enrolment growth was 1969, when roughly 47 per cent of young white males aged 18 to 21 years were enrolled in American colleges and universities. By 1974 that proportion had fallen to a little over 34 per cent.

The proportion of young white women enrolled in American colleges and universities has been roughly stable over this recent period, while the proportion of black students has risen sharply. For example, of young black women, aged 18 or 19, the proportion enrolled in higher education rose from 15 per cent in 1969 to 23 per cent in that five-year period; of black men aged 20 to 21 the proportions rose from 20 per cent to 26 per cent in the same period.

The enormous growth in enrolment during the 1960s, however, was made up of both of a rise in enrolment rates for most categories of students as well as a very large increase in the traditional college-age population.

These few perspectives, however, tell us almost certainly that enrolment and funding require

and which was of the greatest importance for all of our colleges and universities.

Between 1960 and 1973 the number of 18 to 21-year-olds in our population grew from 9 million to 14.7 million. That age group is still growing, though at a much slower rate, and will peak at about 16 million in 1980. By 1985 that age cohort will be smaller than it is today, at about 14 million, and by 1990 it will have fallen to a little over 13 million.

Those demographic facts are central in the prediction of a stabilization or decline of enrolments in the decade of the 1980s. The big uncertainty here of course is the future enrolment rates of older men and women, whether full-time or part-time, degree-credit or non-degree-credit. At the moment that is the most uncertain component in future enrolment forecasts, and since the population is so large, even small changes in enrolment rates will have large consequences for total enrolments.

Another factor entering into the levelling-off of enrolment rates at college-age youth in recent years has been the levelling in the high school graduate rate since the mid-sixties, after a steady rise since the turn of the century. About three-quarters of American youth now gain a high school diploma and that figure has been roughly constant over the past five or six years.

I mention these figures to illustrate the kinds of trends that shape forecasts of the future. These trends also inevitably influence the judgments of those who are sceptical of those forecasts, but nevertheless must act now in the context of uncertainty.

What are some of the short-term problems that slower growth rates, both of enrolments and budgets, are causing our institutions? Let me mention a few very briefly.

In multi-campus systems we are beginning to see much sharper competition for shared resources between "mature" campuses and "new" campuses which have been planning to grow. Should resources be drawn from the mature campuses to meet the plans and promises that have been made to the smaller and newer campuses within the same system?

If those resources are drained off to meet the expectations of the emerging campuses, what happens to the quality of the mature campuses? To what extent are we sacrificing established standards of excellence for the hopes and promises of the 1980s?

There are new and urgent calls for more differentiation in multi-campus systems, which include many of our big state universities, for systems that are a mix of institutions with different missions. Not all, it is said, should aspire to be great research universities with a full spectrum of graduate work in all fields.

These few perspectives, however, tell us almost certainly that enrolment and funding require

changes in a whole variety of plans based on the anticipation of growth. They also sharply violate the understandings on which faculty, administrators and students have been recruited to the new campuses to build research universities. And they also require that some public body manage the life chances of member institutions in systems marked by permanent inequality between institutions.

This kind of inequality is difficult to justify in an egalitarian age; to sustain it as a positive policy generates strains both within the multi-campus systems and in their relations with state agencies of government.

The new slow-growth or steady-state conditions begin to require top administrators to make difficult educational decisions, decisions that inevitably make some people and institutions in the system acutely unhappy. "Steady-state" enrolments, where they have arrived, involve a shift from the promises of "wait" to the finalities of "never".

Moreover, the steady-state condition requires fundamental changes in administrative styles and tasks. During the period of rapid growth, the top administrators of state systems were essentially planning orderly growth, setting timetables and broad priorities as physical plant was built up and staff recruited. University administrators had a great deal to do to insure that the annual budget reflected present and future growth, and that money was spent promptly and as effectively as possible.

The demands of physical growth, however, pre-empted the time and attention of top administrators, who for the most part attended less to the "academic" questions of mission and programme than to "managerial" questions of budget and effective management. Top administrators could avoid the difficult issues of whether a given campus would offer graduate work in a given field, and allow individual institutions to define their own missions and set their own priorities within broad budgetary constraints.

"Steady-state" conditions now force top administrators to make decisions about the future of member campuses and the division of academic labour among them. But in many cases top administrators simply do not know enough about what is going on in different fields on different campuses to make those judgments wisely. They are forced, increasingly, to make fine decisions about programmes in ignorance and at a distance.

In addition, top administrators have built up an often poorly suited new departmental structure, with new departments, and in many cases the top administrators themselves have been appointed to be the managers of growth.

Steady-state forces them to be once again educators, making decisions about the fate of programmes and departments, not just

schools and research units. This entails a fundamental change in the administrative style which each institution is dealing with in its own way, and the changes give rise to uncertainties.

Steady-state problems in single institutions are different from those that face the managers and administrators of state systems, but introduce their own forms of uncertainty into the life of American higher education.

There is of course the difficult problem of deciding on priorities: what fields to encourage and what to cut back, what lines of research to establish and what new teaching arrangements to introduce. These decisions are made against the growing recognition that all resources for new ventures must come out of existing programmes.

But it is one thing to accept that principle; quite another to answer the question what is to be done and how; who is to decide, on what grounds, and with what legitimacy? For example, faculty members do not like to make decisions which adversely affect their colleagues. When it comes to the fate of programmes and departments, however, faculty members may have to be closely involved, in most cases without the assurance they can actually make the painful decisions within the constraints of a constant budget.

Moreover, the principle that all resources for new ventures must come from existing commitments makes it necessary for central institutional administration to design departments so that they are available for new ventures and new appointments without which the institution ceases to live.

There is in addition the problem for many institutions of an aging and largely tenured faculty. Where is new blood going to come from? New appointments are not only the carriers of new ideas in existing disciplines, but are the staff and creators of new disciplines and sub-disciplines.

Institutions increasingly tend to insist that new appointments be made at the junior levels in order to bring as much "fresh blood" as possible into institutions which are making relatively few new appointments. But this policy has its costs too, since in the development of new fields the appointment of untried people involves greater risk than when they come to old and traditional fields of study.

In the past universities have appointed senior people as well as junior people in new lines of work; often it is senior people who have pioneered in those new areas else where and can establish them as new departments. In fact, as new appointments are made, previous appointments at the junior level, it will be hard to establish new subjects, and this is particularly difficult for elite institutions where new disciplines are characteristically first created.

appointments raises questions of how "affirmative action" goals are to be met. The country and most of its leading institutions have a commitment to increase the proportion of women and minority group members on their faculties, and both the federal government and those groups themselves are continuing their pressure on the universities to make those appointments.

When the actual number of new appointments is very small the pressure is not merely to increase the proportions over time, but to make a very large proportion of the few new appointments from these "special categories" in ways that involve the subordination of academic qualifications and achievements to the academically irrelevant considerations of sex, race and ethnicity.

These are among the problems that steady-state conditions create for specific institutions. It is less well recognized, however, that low growth may involve gains for institutions as well. For example, there may well be a distinct reduction in the level of faculty distraction. The very rapid growth of the 1950s and 1960s created the problem, for faculty members and administrators alike, of managing growth rather than of developing programmes. It may be that under conditions of steady-state, university and college teachers and administrators both give more of their time and attention to the quality of the academic programme.

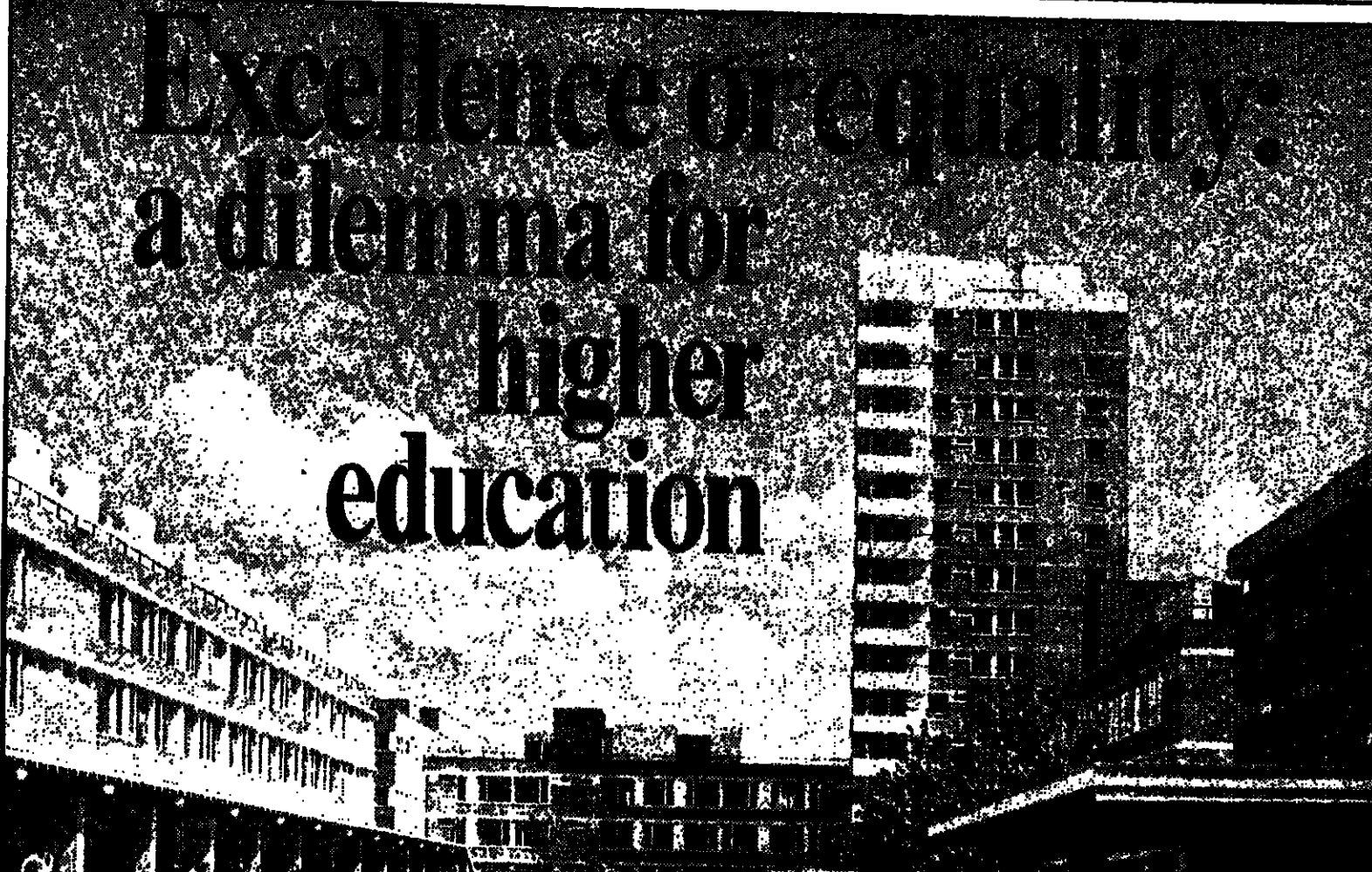
In addition, we may also see a reduction in the rate of mobility of faculty members between institutions, and this in turn may increase academic stability and loyalty, the strength of staff loyalty to institutions and departments, and the character and quality of the relations between teaching and students.

There have been some interesting forays of response to these or related problems. For example, the recognition that innovation cannot be funded by growth appears to be leading institutional leaders to adopt the practice of withdrawing a proportion of existing programme budgets annually for "self-renewal" to be directed to new programmes in response to the emergence of new fields of study and new student interests.

In addition, I think we are seeing a greater emphasis on cooperative arrangements between institutions in sharing of facilities and programme components, libraries, special instructional programmes, and the like—not only between different sectors of public higher education but also between public and private institutions, some of which now have certain kinds of unused capacity.

We may, in fact, see something like the regionalization of higher education to facilitate joint efforts to share capacity. Indeed, we already begin to see this in practice in several parts of the country.

We may see efforts to use faculty





from preceding page

more flexibly. The decline of enrolments in some areas and the growth of others, the emergence of new fields of study and new combinations of fields, pose problems for institutions in what is somewhat euphemistically called 'the steady state' which simply do not arise when change can be funded through growth.

An increasingly required faculty (and new rigidities or protections introduced in some institutions by collective bargaining) only complicate these difficulties. We may well see larger proportions of temporary non-tenured faculty, forming a 'reserve army' of teachers, or part-time faculty, which institutions are able to deploy in response to unanticipated changes in both student and market demand, though we know from history that such categories of casual labour tend also to find ways of protecting their interests, and the unions may be there to help them.

We are also seeing many institutions make much more active efforts to recruit non-traditional students of all kinds. (Of course, this applies to those institutions which have not traditionally done so.) I have suggested that American colleges and universities have always been highly sensitive to student demand, and ready also to search out new missions, functions, and clients.

A recent as yet unpublished national survey of American college and university administrators reports that while only 10 per cent of public research universities put extensive emphasis on the active recruitment of adults between 1968-74, well over half of these same institutions intend to do so between now and 1980.

Among public four-year liberal arts colleges, about a third have been putting a heavy emphasis on recruiting these older students over the past six years, while fully 84 per cent of them intend to do so over the next six years. And in the private sector the changes on this issue are similar, though from a lower starting point.

These efforts are already finding a considerable response among the adult American population. We ordinarily think of the college and university student as a young man or woman between 18 and 22 years of age. But of roughly 10 million students currently enrolled in American colleges and universities, nearly half are over 25, and older than 22. (By comparison, only five years ago students older than 22 constituted only 39 per cent of the total enrolment of 8 million).

Without much reflection or planning, more in response to student demand than to educational ideology, we are in the United States creating a system which is much more open to adults, offering the chances for learning throughout life to all who want it. We are far from having reached that goal yet, but we are much further along than most observers, even in the United States, are aware.

Paradoxically, many of those older students are women. For example, of the 400,000 students enrolled in the State University of New York, almost 10 per cent are aged 35 or older, and three-quarters of those are women. Women compose another fast growing segment of the college and university population.

Between 1968 and 1973 the enrolment of women in colleges and universities increased at almost twice the rate of men—growing by nearly 40 per cent over that five year period as compared with a growth of 20 per cent for men during the same time. And indeed the movement for women's rights which has helped to accelerate the growth in the enrolment of women, is helping to modify college and university rules which have handicapped older and part-time students of both sexes.

Returning to the question of recruiting 'mature students', this will strike European ears as perhaps related to the idea of 'recurrent education'. This idea of recurrent education, or 'lifelong learning', even if not articulated in those terms, has a special hold on the American imagination; it seems to point toward the logical fulfilment of the long movement of American higher education toward universal access. Always has something of the character of a secular religion in the United States, and when that somewhat evangelical element in our colleges and universities has added to it the stimulus of declining growth rates, then

## 'The steady-state condition requires fundamental changes in administrative styles and tasks'

God and Mammon are working together, and together they are a powerful force for institutional change. Emerson said: "The health of the eye needs an horizon." Continuing education, or "lifelong learning" is higher education's horizon. But to translate it into something more than "extension" or adult education is not so easy. We need a good deal of market research, and more adults out there are interested in pursuing formal education, and of what kinds and under what circumstances.

It will need cooperation and perhaps support from business and industry, and also support from the federal government. For example, some thoughtful observers are now beginning to speak of a two-year "educational bank", linked to the social security system, on which people may draw, in the form of enrolment in some post-secondary institution, at any point in their lives.

How far we will actually have created the learning society by 2000 cannot say like everything else, it is dependent on a whole set of contingent developments in other parts of our national life. Nevertheless, it is fair to predict that the search for the non-traditional student, for the older student, the part-time student, the non-credit student, and efforts to modify our institutions to accommodate them, will occupy a good deal of the energies and imagination of people in higher education over the next decade—and that is all very much in the American grain.

Parallel to changes in their policies of recruitment and patterns of enrolment, these institutions also anticipate changes in population in their curriculum. Many institutions say that they will place greater emphasis on professional, semi-professional, and vocationally oriented courses, though it is worth noting that most institutions of every kind also say they intend to reduce their commitment to the humanities.

Whether this is possible remains to be seen. It may reflect the familiar phenomenon in higher education that it is much easier to express an intention to increase efforts in one area than to reveal a readiness to reduce efforts in another. But I am more open to adults, offering the chances for learning throughout life to all who want it. We are far from having reached that goal yet, but we are much further along than most observers, even in the United States, are aware.

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justifying their activities and their uses of resources that they did during the periods of rapid growth. When resources are tight or stable the authorities that allocate those funds, whether they be deans or faculty boards, are under pressure to spend those funds as wisely and prudently and responsibly as they can.

This often means that they want fuller accounting from the spending units on how the money is being spent and more justification for those expenditures, most especially for expenditures on new programmes or activities.

Low growth and tight budgets means in many cases a decline in discretionary funds in schools and departments—those funds for which one has no present plans, which are as yet unallocated and thus most difficult to justify, are the first to disappear in fiscal crisis.

In addition, the decline of discretionary funds has its effects on the creative life of an institution. There are some activities, such as modest support funds for research seminars, travel funds, funds for visitors, and the like which are now less available or require major efforts to gain and justify.

The opportunity costs to the teacher seeking these small sums may be greater than it is worth to him, or else his usefulness declines rapidly over time and therefore may not be worth the inevitable delays associated with applying for it.

I suspect that many college and university teachers would agree that relatively small, easily acquired discretionary funds are among the most valuable funds for the process of education itself. Creative acts, whether in research or teaching, tend to occur spontaneously in ways that are difficult to anticipate or to budget for. And small sums at the

right moment in the hands of the right people have large consequences for the life of the mind. There is another set of problems that might be called "transitional". These have their source in the survival of a set of activities or attitudes from the period of rapid growth into the current period of slow growth. One of these is the current "overproduction" of doctorates in the humanities.

I have already expressed my doubts about our ability to forecast the demand for educated people very well, and that is broadly true. One apparent exception is our ability to project future demands for new college and university teachers. This of course follows not enrolment levels but the rate of growth of undergraduate enrolments.

Between 1965 and 1975 the demand for additional college and university teachers was running at about 27,500 a year, with the demand for new teachers with the doctorate on the order of 12,000 annually. That demand level is now falling, and by one careful estimate it may, by 1985 have fallen to nearly zero. By contrast the number of doctorates awarded annually had reached 33,000 by 1972 and is now falling quite slowly if for no other reason than there are still very large numbers of doctoral candidates still in the pipeline.

Now it is true that overall only a little over half (56 per cent) of all doctorates take their first jobs in a college or university, and that the proportion varies sharply among fields, ranging from a quarter of doctoral engineers and two-fifths of those in the arts and humanities.

There is also reason to believe that non-academic demands for highly educated scientists and social scientists will hold up and may even expand somewhat in a society increasingly based on the application of knowledge. Research on energy is the current area of rapid growth in research and development, the successor to the big space programmes of the 1960s.

Moreover, there is a steady educational inflation of jobs. People with doctorates come increasingly to take jobs formerly held by people with lesser qualifications, and in the process, they often reshape the jobs they enter. One recent projection of the National Science Foundation anticipates that "nearly half of all new job openings expected to be filled by doctoral level scientists and engineers in the 1972-1985 period will be in non-academic, non-research positions as compared with one-seventh in 1972".

On the supply side, institutions, without any central direction or plan, are responding to perceived market conditions by cutting back their graduate enrolments and raising their standards both for admission and for the awarding of a degree. While a variety of market forces and institutional responses may well bring the production of science and social science doctorates into rough equilibrium with the demands of the market, two kinds of problems remain visible and troublesome already. One has to do with the content of graduate science education.

In many fields there highly specialized form of education, largely keyed to traditional careers in high level teaching and research, will have to be modified to meet the needs of students who will be entering non-traditional occupations. Though it is not easy for a research-oriented science department to shift its graduate curriculum from an almost exclusive concern for the advancement of science and the training of young research scientists, I believe this movement has already begun in many high science departments.

This is not a development we are likely to hear very much about: this kind of change in the private life of higher education tends to be invisible to those who are not involved with it. But I believe it will be achieved through a kind of dividing of labour within graduate departments, with the training of research scientists going on the one side with an education for other roles in society than in research and development.

The arts and humanities face a more difficult problem, especially during the transition to slow growth. In the big research universities, the rapid growth in graduate enrolments and doctorate production in the arts and humanities was almost wholly a response to the enormous growth of undergraduate enrolments and thus of the academic profession in the 1950s and 1960s.

For example, the number of students studying for advanced, i.e. post-graduate degrees in English and journalism grew from 13,000 in 1960 to over 56,000 by 1971; on the fine arts the growth was from 9,000 to 24,000 over the same period. Much the same story applies to history, foreign languages and literature, philosophy and other humanities studies.

These are the fields that have traditionally prepared students primarily for academic careers. Graduate enrolments in these fields have now levelled off and indeed begun to decline, but they have not done so as fast as has the academic job market, nor especially as fast as the number of jobs in the kinds of institutions for which most doctoral graduate students thought or hoped they were preparing.

There is thus, in some of the leading departments of humanities and fine arts, a serious disjunction between the training and expectations of many graduate students and the likelihood of their getting such training and aspirations. And the situation is not likely to improve, but may indeed worsen, over the next decade in the face of the realities of the academic job market.

What will be done with the large research departments in history, English, foreign languages, philosophy, classics, and so on?

Some will surely be putting more of their time and energies into their undergraduate teaching; some will find it possible to confine their scholarly work with fewer graduate students to share their specialized interests; still others will find new purposes for their departments, for example, in programmes of interdisciplinary study for older and non-traditional students, leading to a wider range of occupations.

The forms and patterns of response to the new situation differ enormously between individuals and between departments, even in the same disciplines, and between institutions, and are affected by such important factors as how long is allowed for the transitional phase, and how much time is available for the slow adaptation of old habits to new exigencies.

This leads me to the question of "manpower planning". For it is clear from what I have just said that there are two broad strategies that an institution or department may employ, when faced with the apparent "overproduction" of some category of trained person.

One is the response of "manpower planning", to cut back production of this category to meet predicted demand. The other is to modify the forms of training in that field or qualification, to expand and diversify the range of occupations for which it prepares people, and thus to loosen the close link between training and occupation.

For various reasons we in America are more inclined to the second response. For one thing, as I've suggested, our leading universities are creating a larger response to past high demand for new academics. These departments, however, come to have a life of their own; they are full of talented professors and can't just be phased out.

Moreover, they continue to perform the research functions independent of demand for research. The response to these departments is to come to these departments to do advanced graduate work even when they are warned about poor job prospects and even when support funds for them are cut back. I have already stressed the provisory of our colleges and universities to student demand, even if "misguided".

I think our preference for modifying the curriculum and diversifying the training, rather than cutting production in line with market predictions, illustrates very sharply the difference between the traditional view of education and the new view. It is governed by the traditional and assumptions of elite universities.

Elite university systems are essentially "sponsoring" systems, with there is a rough congruence between the number of graduates and the number of elite posts. If there is some excess of graduates, they can create new sectors of elite activity, or be shipped off to India, or whatever the function equivalent is.

Of course, even in a sponsored situation, the highest rewards in modern societies tend to be concentrated, but I want to emphasize the importance of the sponsorship: to be sponsored is to be able to assume early in your education that there will be a respectable place for you in society and the economy after you leave the university.

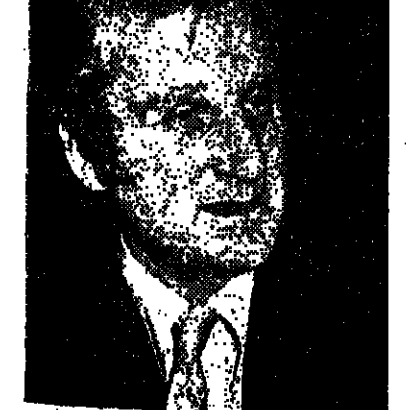
The transformation of those elite systems into mass systems converts them into competitive systems all the way through. Graduates cannot be guaranteed elite posts.

But the system of expectations appropriate to elite systems survives into the mass phase, creating considerable discontent among the growing numbers of graduates of European universities who do not gain the jobs of the appropriate status and dignity that they have been led in part by history and in part by their parents and secondary school teachers, to expect.

In addition, a growth in the numbers of graduates, and changes in their social origins, is necessarily associated with a decline in the status of graduates, and that is a further source of disappointment and resentment of European university graduates.

This has little to do with their being "overqualified" for the available jobs. Most higher white collar jobs, including technical work, can be done with two years of post-secondary training or six years. The work may be done somewhat differently, but most jobs, and indeed many occupations, are shaped more by the quality of recruitment to them rather than by any rigid connection between an educational qualification and the technical requirements of the job.

In other words, I think that the very concept of "overqualified graduates" is an aspect of the status honour or degradation associated



Gareth Williams, professor of educational planning at Lancaster University, and chairman of the conference planning committee.

Governments and tax-payers are becoming more insistent in demanding an answer to the question: "What are universities for?" For prefer, "higher education". Answers are rarely precise: phrases like "pursuit of excellence", "extension of knowledge", "skilled manpower", "serve society" and "expanded educational opportunities" are usually proffered.

The last focuses on an even more interesting question: "Who are universities for?" Some people claim that universities and polytechnics should be making a greater contribution to social equality. Should higher education be used as a kind of compensatory device to recompense young people suffering from other social disadvantages?

Present financial stringencies have sharpened this debate, which provides the theme of the Third International Conference being held at Lancaster University next week.

Excellence means different things to different people. To Lord James of Rutherford, it appears to be synonymous with proficiency at mathematics, philosophy and a short list of "respectable" subjects; to Dr Hunter of Birmingham it means who goes on to Birmingham and a few other favoured universities. To Lord Ashby the "Gift clear stream of excellence" (running, presumably, into a pool of ability) is an

## 'Science education must be modified to meet the needs of students entering non-traditional occupations'

with specific jobs rather than of their technical requirements. Manpower planning accepts the traditional links between jobs and qualifications, and tries, above all, to avoid having to place people in jobs with less dignity than their qualifications have traditionally commanded.

It is, in my view, a transfer of elite concepts and assumptions into the phase of advanced graduate studies—that is to increase the "substitutability" of their product. Some I think are already beginning to move in this direction, but how successfully remains to be seen.

Let me point to a similar problem involving yet another kind of expectations among teachers and students. Just three centuries ago, Samuel Pepys, defending the Naval Board against charges of inefficiency and corruption in the recent war with the Dutch, spoke in a vivid phrase of "the costliness of poverty".

He was speaking of the difficulties of meeting the necessities of war in the face of irregular and generally inadequate Treasury disbursements. Credit, he argued, costs money; supplies could not be bought at favourable prices in small quantities and on uncertain terms of payment, and so on.

We also are learning of "the costliness of poverty" in the academic building planned and designed but not built in the undergraduate programmes started and started; in new universities established or expanded, research facilities recruited and their research left unfunded; their graduate students admitted and left unsupported.

But the academic profession is highly conservative in this regard; colleges and universities and their close link between academic posts and specific forms of graduate edu-

cation. This makes manpower planning—or at least manpower profession more "successful" than it is for most other occupations.

The present challenge, in many big research departments, especially in the humanities, will be whether they can modify their forms of graduate training to extend the range of jobs and careers available for their advanced graduate students—that is to increase the "substitutability" of their product. Some I think are already beginning to move in this direction, but how successfully remains to be seen.

Indeed, the level budgets that make impossible the expansion of graduate work and research, and thus foreclose significant institutional mobility, are, to an observer, "poverty" only by comparison with earlier extravagant hopes and ambitions.

The deprivation in many cases is more relative than real. But we know from studies of reference group behaviour in many areas of life that a sense of relative deprivation can be a sharp source of discontent.

One central dilemma that we are now facing takes the form of a tension between centralization and diversity. On the one hand the slowing down of growth and the tightening of resources both tend to strengthen the centralization of academic decision-making.

The tendency toward stronger central control occurs at every level of higher education: of chairmen over their departments, of deans over their schools, of presidents over their colleges and universities, of chancellors over their multi-campus systems, of state administrative

agencies or legislative committees over the state systems.

On the general question, I think it fair to say that the American education scene: a strong tendency of higher education under current conditions is for authority that is traditionally been widely dispersed to be more highly concentrated. This is a concentration of power relative to the free-wheeling dispersion of power and initiative of the decades of rapid growth.

Increasing centralization of academic authority has several sources. In particular it appears to permit a more efficient management, both of funds and of other resources such as personnel and space, that is possible through the loosely cordoned, autonomous decisions of many smaller component units, whether they be individual faculty members, departments or campuses.

I should make clear that I have reservations about whether the efficiencies thus pursued or achieved are in fact genuine efficiencies in the achievement of desired educational outcomes, rather than the achievement of accounting systems. In the latter case they may well be the expense of the effectiveness of academic programmes rather than to their benefit: much hinges on what outcomes of higher education are taken into account in the assessment of its efficiency, and how that efficiency is measured.

In any event, whatever my views on this matter, conventional wisdom, especially as located in state agencies and departments of finance, tends to see central management as inherently more efficient than the dispersal of authority in what appears from the outside to be anarchy. And whether or not they are right, they have enough power to press these institutions toward a greater centralization of both authority and responsibility.

An edited version of a paper delivered by Professor Tron to a conference in London in May, 1975, on the impact of low growth for higher education.

One of the favourite claims of those who seek a larger share of a smaller pool of resources is the need for centres of excellence. But what exactly is a centre of excellence? In an age of telephony and rapid transport by road, rail and air, rapid library loans, photocopying facilities, and, of course, international conferences, how necessary is it to have many of the leading scholars in the same place, concentrated in a particular institution?

Conversely is it economically viable to fragment academic activities, particularly research activities? Obviously where scientific research is heavily capital intensive it must be concentrated in a few geographic locations, but access to the facilities, and to the scholars, must be regarded by other departments that are not so favoured?

Should the financial resources of the research councils be increased so as to safeguard the financial needs of excellence in individual institutions and departments or by individual scholars, while equality of treatment as far as teaching is concerned is assured through University Grants Committee finances and the local authority pool?

A valid question. As a student of political history I would be aware that universities have had their ups and downs for centuries. What should be particularly interesting for him, however, is to learn from the experience of participants from overseas the extent to which the current slump in the political popularity of higher education in Britain is also being experienced in countries as far apart geographically and ideologically as the United States, Poland and Spain as well as scores of other countries which will be sending participants.

We see the costliness of poverty when long-standing library subscriptions to scholarly or scientific journals are broken, or special collections are not longer kept current, or when full professors type their own letters or spend their time filling out forms.

It is difficult to say how great are the costs of the new situation in unfulfilled plans and hopes in American colleges and universities; the very great number of institutions affected, and the enormous range in their situations makes it difficult to know what the costs have been.

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## The danger of putting faith in science

Perhaps it was inevitable. In his presidential address to last year's annual meeting of the British Association for the Advancement of Science, Sir John Kendrew spoke at length of the extent to which science was useful in achieving social goals, and worried of the dangers to our technological and economic development if scientific research was starved of funds. His successor, Sir Bernard Lovell, addressing this year's conference at the University of Surrey, produced the counter-argument: there is an equal danger in putting too much faith in science as a simple solution to the problems of society; we should seek its true value in the transcendental realm of "understanding" and "happiness" (even if current theories about the beginning of the universe make it necessary for us to put these values on some type of materialistic foundation).

Sir Bernard's concern is understandable. A naive faith in science as the root of social progress is as misleading and potentially dangerous as the attitude which contends that science exists independently of society and of human understanding. The same case is argued by Michael Fores on the opposite page. No one disputes that modern science is a necessary activity of any society which depends for its existence on the functioning of a vast technological complex; what is disputed is that science, or in an even more limited sense, the occasional flashes of inspired genius, is sufficient to maintain and develop this complex.

In a sense, too, Sir Bernard's presidential remarks to the BA seem destined to strike a chord of understanding with many working scientists. Last year, when science appeared to be under attack for its failure to relate to the needs of society, scientists found themselves at a result arguing in their defence that even research of the most fundamental nature is likely to lead to an eventual economic or technological payoff. Thus we find at the BA's present meeting a full-day symposium in which the research councils have promised to expose themselves to public scrutiny, with a final session under the title "some benefits of fundamental science" addressed by Sir John Gray, secretary of the Medical Research Council.

Within the last year, however, and in the period since this year's BA programme was planned—the effects on universities and research laboratories of the country's declining economic situation has led many scientists to question the value of their "colossal" arguments of their colleagues and to argue the need to defend science as an activity of intrinsic value.

Of course any advanced industrialized country needs an active scientific community if it is to continue to develop in a technological sense. Such scientists argue. Nevertheless, we should not let our eagerness to "harness" science to social ends blind ourselves to the fact that the true nature of science lies in the human search for knowledge and understanding, not in the benefits which may flow from it.

Having said this, it is with a sense of relief that scientists feel able to relinquish any qualms they might have had about the need to justify their work in terms of its social usefulness. Scientists are never particularly happy arguing about what "social responsibilities" they may or may not have; the fascination of the laboratory bench, the abstract nature of the scientific method,

apparently indeterminate, and messy processes of social and political life. When the former are secure, the latter can be discussed casually over coffee; when the former are threatened with economic survival, then the lines of defence contract and are hastily erected around what only last year Sir John Kendrew referred to as an activity that might appear to future historians similar to the "pettyfogging scholasticism of medieval times".

The dangers of such a shift are immediately obvious. Within the higher education sector as a whole, the pressures of economic hardship are becoming expressed directly in issues of social and political choice, hence, for example, the "debate" over the future of higher education as a theme for next week's international conference at Lancaster University. Similarly within science any attempt to resurrect the argument for supporting science essentially as a socially autonomous activity of intrinsic cultural value can only challenge any political moves to give priority to maintaining the material—rather than spiritual—well-being of the whole community.

Equally, shifts in attitudes can only be related to shifts in underlying economic and political factors which they then come to reflect. A return to the argument in defence of pure science can be directly correlated with both economic threats to the survival of research scientists in the broad sense to the growing challenges to prevailing notions of "law and order" that govern the world of men. When the political issues appeared simple, they fitted neatly into a moral view of the world that the scientist could easily comprehend within his picture of an orderly universe; to condemn atomic weapons, chemical and biological warfare techniques, or the Vietnam war, required no great analysis of the political issues at stake, and could be done almost as simply as voting in the EEC referendum.

As political problems come nearer home, however, such simple views of the world become more difficult to maintain. The effects of inflation and the resultant Government policies, on the one hand, and the growing militancy of the trade union movement, on the other, require a choice of values that cannot be made so simply as scientists might like to—merely in terms of stating a preference for order over chaos. The important question now is: what type of order is to be preferred. In the 1930s planning and socialism were virtually synonymous, a factor that provided a crucial component in the political activities of scientists such as J. D. Bernal. Today the imposition of a centralized, bureaucratic type of social order has become to many, one of the less acceptable faces of capitalism; yet any attempt to renounce respect for the individual within the social structure poses immediate problems for scientists eager to achieve a compatibility between his interpretations of the underlying orderliness and objectivity to fundamental laws—between the natural and the social world.

To retreat to the laboratory bench may provide temporary refuge from this paradox, but can only confine, rather than solve, the underlying dilemma. For, as Michael Fores argues, to accept and propagate the values of science as an ideological dogma can only serve to obscure acquiescence to prevailing economic, social and political forces. In no way can it be said that the values of men are made by men—whether for good or ill. To resort to an idealistic faith in the second coming of a "scientific genius" that will remove our problems with the shake of a test tube is to lay ourselves open to the fallacies of scientism, open to the dangers of self-delusion that have no place

## LETTERS TO THE EDITOR

### Academic salaries

from Mr Jonathan Shum

Sir,—Dr Radford's justifiable lament (*THE TIMES* August 15) is surely shared by those in polytechnic-type institutions throughout the United Kingdom. But it may not be generally known yet that a growing number of university lecturers or researchers are beginning to favour a relatively radical idea of having a common salary structure, based on (if not entirely) Houghton, for academic staff responsible for both university and CNA undergraduate degree courses.

This phenomenon was much in evidence at informal meetings of several scientific conferences which I have attended since publication of the Houghton Report.

Perhaps for the first time, grassroots academics, particularly the younger ones, want to talk to one another, breaking down the hitherto "them-and-us" barrier, and may soon exert appropriate pressure in effecting a rapprochement.

The general views, as I saw them, were that (a) such a common salary structure was desirable and was in the interest of the future of British higher education, (b) to give due recognition to those with substantial research experience/programmes and postgraduate supervision load, especially those who could claim "international reputation" (whatever that might mean), there might well be an additional research scale superimposed on the common salary scale, and (c) if the non-university staff were to accept the above principle gladly, their needs for and claims on the nation's resources for academic and technological research must in future be given the same favourable consideration which their university colleagues always received.

Although the majority of the university participants at these informal discussions were in the lecturer grade, I can recall at least three departmental lecturers and one professor (admittedly he only got his chair two years ago) who have also come out in favour, on principle, of this "come together" idea.

Like most new and perhaps radical attempts to tackle any complex problem which is bedeviled by old prejudices and new jealousy from both sides, this one will be criticized and branded as "simplistic" or worse.

But I should like to point out that this movement has started, is likely to grow, and deserves wide attention and realistic but urgent evaluation by all who have our

higher education's future at heart. Pioneers like Dr Radford need not be disheartened. Let us keep talking to one another through, and if need be by-passing, at some stages, our professional representatives. Yours faithfully, JONATHAN SHUM, Department of Social Sciences, Glasgow College of Technology.

from Mr M. F. Morrison

Sir,—While agreeing with your editorial view (*THE TIMES*, August 15) that a neutral assessment of the salaries issue is necessary, I am amazed that you should be unaware of two basic flaws in your argument that a broad comparability of salary scales in universities and polytechnics will be achieved if the AUT accepts the latest Department of Education and Science salary offer.

The scales you quote as evidence of this comparability are based on a 1974-75 settlement for polytechnic staff but on a 1975-76 settlement for university staff. Clearly any comparison must be based on 1975-76 settlements for both sectors; since polytechnic staff will doubtless receive a £312 rise in April, 1976, your argument that broad comparability has been achieved simply is not true.

Secondly, the university lecturer scale has 16 points whereas the lecturer 11/senior lecturer scale (the polytechnic equivalent for staff doing degree level work) contains only 14 points.

Increments are therefore greater and polytechnic staff reach the top of the scale two years ahead of their university counterparts.

Unless these two anomalies are eliminated broad comparability between the scales in the two sectors will never be realized. Yours faithfully, M. F. MORRISON, 3 Foxroxy Avenue, Miffield, Yorkshire.

from Mr Leslie Wagner

Sir,—Heads I win, tails you lose? In 1974 university teachers were clobbered because we negotiated and settled our pay whilst wage restrictions were in force even though the settlement itself came into effect when there was no restraint.

In 1975 we are clobbered because although we negotiated and settled our pay when no formal policy of restraint was in force this comes into effect after such a policy has been introduced. Will someone explain the logic of this state of affairs, please? Yours faithfully, LESLIE WAGNER, Faculty of Social Sciences, The Open University.

### French exchange

from Miss Mary Wynn

Sir,—The article by George Morgan on student interchange between Britain and France (*THE TIMES*, August 1) has unfortunately given rise to some misunderstanding, as the letter from the University of Sussex (*THE TIMES*, August 9) shows. The two papers mentioned by Mr Morgan have not in fact been published; they are working documents being prepared for a joint meeting of the British contribution, for which this department was responsible, was circulated in draft to a large number of institutions and individuals in this country and has been generally approved, but some late alterations may still be made. The French authorities, for their part, are considering amendments to their paper which we have suggested.

One of these concerns the reference to UCCA to which Mr Morgan and Miss Broadway from the University of Sussex have taken exception. Our two papers makes it clear that this procedure applies only to first degree courses. There are separate sections about postgraduate studies and about shorter periods in British universities. If the French paper, not as the article seems to indicate, the

cedure limits freedom of choice, and we have suggested to the French writers that they might reconsider this passage.

My colleagues in Paris, far from "discouraging" potential students (and more senior academics) from coming to Britain, are doing all they can to stimulate such visits. The paper which we have submitted is designed to show that there are not "almost insurmountable financial and administrative hurdles". Though we could not do otherwise than state the "problems of finance, we have, as the article states, drawn attention to ways of surmounting them. So far as administrative and academic matters are concerned, the tone of our report is that these set no more problems for French than for British students.

This joint presentation of the facts was, as Mr Morgan says, requested by a meeting of French and British academics in order to help each side to identify and overcome the obstacles inhibiting student interchange and in particular to encourage more French students to come to Britain.

Yours faithfully, MARY WYNN, Director, Higher Education Department, The British Council.

### Civil Service fees

from Mr D. L. Munby

Sir,—There may be many teachers in higher education who give occasional lectures in the Civil Service College or assist the Civil Service Department in fee paid work. Not all will know the bureaucratic hazards to which they now submit themselves if they undertake these tasks. Normally, but not always, they will be sent a brief note about income tax (SP 27/31/01, dated March 1975), and perhaps some information about national insurance. But they may not realize without careful scrutiny quite what this involves.

Someone who gives an occasional lecture for a fee under ordinary circumstances is taxed under schedule D (and perhaps mostly pays tax at more than the standard rate). It expects to be paid expenses for travel from his home base, and other out-of-pocket outlays, which are not taxable, separately from the fee as previously in the Civil Service Department. His tax return will be straightforward.

The present procedure of the CSD is to treat every casual lecturer, etc., as if he were employed at the place where he delivers his lecture, and so to deduct tax at national insurance under schedule E (PAYE).

Expenses are *de facto* treated as if part of the remuneration. If the lecturer were indeed employed at the place where he lectured, his journey to work expenses could not be claimed as tax deductible. The CSD, however, graciously pays expenses grossed up at the standard rate or, if the proper forms are sent in, at more than the standard rate. But there is no guarantee of the correct grossing up relevant to the actual year, so that actual expenses cannot automatically be paid.

In the case of national insurance, a "self-employed" lecturer may be exempt, or contributions may be reduced if he already pays the minimum Class 2 contribution (the £2316/74/CC) for national insurance details, but the finance division of the department does in fact (at least sometimes) deduct the national insurance contribution without asking for the details which alone would enable it to be credited to the right account, and to make an arbitrary form of taxation for the benefit of persons unknown.

In short, in order to secure payment of his expenses (or in the official language "a close approximation of that amount") a lecturer will have (a) to fill in an expense form, and (b) to have a complexly devised for civil servants travelling on official business (to be sent in the department), (c) to send in the civil service tax department in Canada all the details of his tax situation to enable a more than adequate assessment to be made, and (d) to fill in the national insurance form to be sent in the department.

He will then receive payment of his fee (£25 for a lecture) plus grossed-up expenses less the deductions, and a computerized printout with no details of the gross sum and its breakdown, which is useless for tax purposes.

To save the harassed lecturer, however, the department has devised a quick method of avoiding bureaucracy: don't send him the forms informing him of the payment he has no chance to claim his rights under the scheme, but pay out in such a way that if he pays out more than the standard rate, he will definitely not be paid his expenses, and there will be no chance of the national insurance contribution being credited to him.

May I suggest that the only way to deal with this tangle of red tape, those who might think it was some form of public service to help a lecturer, civil servants at a modest fee, simply to refuse to undertake these services under present conditions.

One does not, after all, spend the hours to give a lecture for the sake of the fee. One expects to have one's expenses paid, and one to be involved in a modest of paper work. It is said that our highly intelligent civil servants cannot avoid ways of avoiding this administrative nonsense.

Yours faithfully, D. L. MUNBY, Nuffield College, Oxford.

## Science, culture and national laziness

Some time ago I wrote an article critical of the idea that there is a unique important "two cultures" gap in our Western society. I argued that to claim the existence of a single divide between "science" and "the arts", along the lines of C. P. Snow's thesis, is misleading for analysis of the culture. For a similar, and possibly more important, cultural split can be discerned between the reactions of practitioners in all the useful arts and professions (such as law, accountancy, medicine and engineering) and of those in all areas of scholarship, science and the "fine arts" (such as physics, history, biology, sociology and literature).

This second gap might be described as one between "technology" and the rest. Exponents on one side assess phenomena for their utility and react accordingly, whereas exponents on the other are concerned with phenomena being interesting.

Although this gap may appear wide at times, the best general assessment is that we, in the West, all live within the influence of a broadly unified single culture, influenced alike by science, art and useful techniques. Such an assessment is supported by a powerful general conviction that things which are true are likely to be more useful than things that are false.

While maintaining the one-culture conclusion for Western society, it is important in note that assessments about the culture and human achievements often contain an unfortunate bias. There are two dominant descriptions of the distinctive characteristics and achievements of the species, each based on ways in which man's (and woman's) creative genius affects civilization and the culture.

In one description man is the thinking animal, unique in his ability to use reason to solve problems posed by his environment. In the other, man is the reflective creature, and wise after a fashion. The second description sees man as unique through his ability to make and use tools to extend his direct and personal powers. So he is distinctively *homo faber*, fixer and activist.

Possibly a group of people can become bored by civilization, but Clark claims very reasonably: "The boredom of barbarism is infinitely greater. Quite apart from discomforts and privations, there was no escape from it. Very restricted company, no books, no light after dark, no hope. On one side the sea battering away, on the other infinite stretches of bog and forest."

In his treatment of civilization, Clark deals mainly with the history of art and architecture, only a little with science and useful techniques of manufacture. Newton and Brunel are mentioned, but not Ampere or Kelvin; Leonardo da Vinci is dealt with as a painter and sculptor, not for the 20 years work which he put in as an engineer for the Duke of Milan.

The question raised by Clark's work is totally different from that raised by Koestler's. The worry about Koestler was that he had not covered all aspects of his subject; for Clark it is that he is not faithful to his own expressed interest.

In one passage, Clark argues that Western civilization, the subject of his presentation, was probably sired in the Dark Ages by craftsmen; but if craft was important at that time, and civilization is the obverse of barbarism, then crafts and useful techniques are surprisingly neglected. There is also a surprising neglect of the special influence of science in helping to free the world from barbarism through its attack on ignorance and "accident" or "truth".

So far this article has dealt with aspects of man's culture and his special genius. Sadly, mistreatment of both stems partly from major misconceptions about science, especially in our Anglo-Saxon sub-culture. The argument which follows aims to restore science to the place it should—and used to—hold.

In his book *Public Knowledge*, the physicist John Ziman, deals with various ideas of science, and concludes that to describe science as the mastery of man's environment is a "vulgar conception". Following Ziman, who are the culprits in this art of vulgarization? They are those who talk of *homo faber* activities as being part of "applied science", for recent study has shown that technical advance, even today, is not typically caused by the direct application of scientific knowledge.

Another set of culprits are those who claim to be engaged in "science proper" when in fact they are engaged in "applied science" or "technology". This kind of policy is defined to include, only



(From top) Francis Bacon, Isaac Newton, Charles Darwin, four of Britain's greatest scientists, each of whom was rejected, or was rejected by, Cambridge University.

### Michael Fores argues that misconceptions about science as a cultural activity have led to unwarranted faith in 'recumbent heroics'

of civilization. Like the results of creativity, various aspects of our civilization are objects which we pride in the general culture. Although Lord Clark comes nearer to a full perception of his subject than Koestler does, the treatment is again limited. Clark claims that it was the word "civilization" which persuaded him to undertake his famous television series. In a book based on that series, he explains that, unsure at first what civilization meant, he only knew he preferred it to barbarism.

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relative decline since 1945. So surely our applied science cannot have had it any science is up to scratch. Something or more exactly someone, will certainly turn up! A freakish island genius, quite possibly, a scientist, will do the trick.

Why, one might well ask, should science be so central to this analysis? and how would a different conception of science help? It happens to believe that science is central to the culture and to an understanding of it. For all the tool-making and bomb-throwing which has gone on over the years, science (natural and otherwise) provides one of man's greatest achievements and the search for truth one of his greatest aspirations.

As implied earlier, however, it has often been the scientists who have sold science down the river. Among them men of genius and of special distinction, they must have discerned the special Anglo-Saxon laziness.

Only in this way could they be sure of the success of siren promises that science will bring prosperity with its flash of inspiration. Only in this way could they be so successful in the totally bogus "applied science" argument that they have used to persuade an adoring world that useful technique is just an extended part of science itself.

What total nonsense this all is! And what an arid quest to ask if a Ford or a Marconi or an Edison was an educated man, if a Watt or a Diesel knew his basic science. In every case of major technical advance, the most crucial factors have been the pioneer's conception of design and manufacture, of basic need and utility, coupled with his ability to worry his way through to his goal.

It is partly, I contend, lay talk of "technology" which has confused scientists and others. Search around the literature and you will find that whenever this monstrous conception is introduced into discussion, reason goes out of the window!

In conclusion, I have tried to point out that all the studies of the work of Ziman's, fall down significantly in their treatment of the general culture. At least four lessons arise. One is that accent on the dramatic tends to make the observer lose sight of the typical. Whatever happened in certain cases, typical technical development, which influenced civilized life profoundly, is almost always divorced from the development of science.

Thus the "technology is really applied science" argument incorporates a massive misreading of events. Even useful artifacts which result from unusually creative effort are rarely the fruits of "applied science" sensibly described.

A second lesson concerns an aspect of the special British sickness, our laziness. In the study already referred to, Bronowski contrasts two 17th-century traditions, as shown up by two great men. "Characteristically, Descartes did most of his scientific work in bed; and Bacon died of a cold which he caught... when at the age of 65 he tried the experiment of stuffing a fowl with snow."

Other evidence does, in fact, support this brief depiction of what was typical of French and English thinking of the time. But by the twentieth century, roles had been reversed. It is the English who now have their recumbent heroes, whereas the French have become fonder of tireless workers.

Every English boy who has studied science or the classics has Archimedes as one recumbent hero, whereas, Keynes has named some of his heroes for part of their famous English shrines. King's College Cambridge, similarly from a bath.

A third lesson concerns the English shrines which is alma mater of our scientific tradition. Without too much fear of contradiction—and by defining science widely to cover all areas of scholarship—our four most famous names of history have been Bacon, Newton, Darwin and Keynes. All were rejected by the University of Cambridge or rejected it themselves.

Bacon studied law there, but achieved eminence on his own. Newton was eased out for his personal beliefs, as was Bertrand Russell. Keynes despite a long association, gave up his lectureship well before producing his best work, which was done elsewhere. Darwin was awarded a pass degree. For all the fame of Rutherford, a foreigner by birth, the record suggests that our scientific shrines have not been so sympathetic to the development of science itself.

The last lesson is the central one. Analysis of the culture, strongly influenced as it is by science, is not, in the event, so different as some attempts make out. Rules for the first steps to take are the same as they always have been, and stem from an era well before scholarship became influenced by mathematics or science dealt with the idea of cause.

Choose your topic. Decide what the world means. Classify. Then fire away. Too many scientists have failed to contribute cogently to general and cultural analysis through neglect of this first basic step of science itself. Others have failed too, of course. But many of us had hoped for something extra from science.

The author is a member of the Government economic service; but all views expressed are personal.



Clive Ashwin discusses the educational role and responsibilities of the National Gallery

## How to bridge the gap from art scholarship to popular education

The staff of museums and art galleries have in recent years been expected to adopt a more positive educational role towards their public as well as continuing with the traditional business of conservation, restoration and exhibition.

Unlike the staff of schools, colleges and universities, however, museum and gallery staff do not enjoy the relative luxury of having their clientele conveniently banded into groups according to age, ability or previous experience. On a normal day anything and everything may come pouring through the turnstiles, push-chairs and baby-carriages, hishops and barbers, vice-chancellors and vandals.

How, then, does one begin to characterize, define or cater for this heterogeneous mass of humanity, and somehow communicate? Anyone who has lectured to an ad hoc adult group will recollect the utter impossibility of detecting the physiognomic distinction between rapt attention and stony incomprehension.

As the nation's foremost picture gallery, London's National Gallery has a special responsibility to lead the way in responding to the increasing educational demands of a growing and broadening public.

One could argue, of course, that in itself a form of ostensive education, although of a fairly primitive kind. What really counts is the precise mode of exhibition, the spatial and logical relation between exhibits and, above all, what you tell or show people in order to complement and enrich their encounter with the original work.

If you intend to pay a visit to the National Gallery in the near future, ignore the narrow and congested entrance on Trafalgar Square. Enter it instead by the recently opened north entrance in Orange Street, just off Charing Cross Road. You will be surprised by the contrast and, perhaps, find it difficult to believe that the cool areas of travertine and plate glass belong to the same institution.

The sense of contrast and innovation is heightened by the fact that the north entrance leads the visitor straight into an ambitious temporary exhibition entitled "The Rival of Nature" which is a conception and presentation of a striking new departure for the gallery. The exhibition examines Renaissance art by means of a series of thematic groups such as pagan

sources, landscape and portraiture, each theme being illustrated by a carefully-balanced cluster of exhibits.

Manifestly designed as an essay in popular education, the exhibition is indicative of the positive and outgoing educational policy adopted by the gallery in recent years. The explanatory texts are calculated to help the lay visitor without swamping him with verbiage, and experience of the objects is directly complemented by the use of sound recording and tape-slide presentation.

Although the core of the exhibition is composed of familiar National Gallery masterpieces, including Holbein's *Ambassadors* and Titian's opulent *Bacchus and Ariadne*, these are richly supplemented by a wide range of sculpture, ceramics, prints, books and other objects which generate a sense of total ambience pictures alone can rarely attain.

The division of the floor space into bays creates a feeling of intimate contact with the exhibits which, because of the scale of its rooms, the gallery has hitherto been unable to achieve. Mercifully, it avoids the soporific gloom beloved by many exhibition designers and which has marred so many temporary exhibitions at home and abroad.

When the National Gallery first opened its doors to the public in 1824 one of the original purposes for its foundation was educational—namely, the provision of copying facilities for students of painting, and on two days of the week entry was restricted to copyists.

Bearing in mind the fact that it was closed on Sundays, for six weeks in the autumn and, in the absence of artificial light, could remain open only as long as the daylight lasted, it becomes clear that only a small sector of the population could have found the opportunity to enjoy it.

In spite of the prodigious increase in the number of art students copying has declined to little more than a fringe activity, unlikely seriously to interfere with the use of the gallery by other sectors of the public. In fact, these days art students are more likely to be brought to the National by their art history tutors than by studio staff.

Parallel with the decline of copying came a steady rise in the scholarly functions of the gallery, with obvious implications for higher education. The appointment of Sir Charles Lock Eastlake as director in 1855 confirmed a swing to scholarship as distinct from passive and not very expert conservation. Eastlake, who translated Goethe's *Theory of Colours* and wrote a major treatise on the technique of



Leonardo da Vinci's study of five heads, part of the National Gallery's current exhibition of Renaissance Art.

oil painting, initiated the policy of systematic purchase which has made the present collection the best of its kind in the world. Although he was not an art historian in the contemporary sense—many of his acquisitions are now on view under different attributions—Eastlake established the principle that the gallery and its staff should constitute a national centre of art scholarship, and this tradition of erudition is fully demonstrated by the excellence of the recent series of catalogues.

The status of the gallery as a repository of scholarship has had an important bearing on the growth of art history in Britain, notably during the past half-century. Its collection continues to be a seminal focus for art historical research; similarly, most of its staff have teaching commitments at one of the art historical centres near to London.

At the same time as art scholarship expanded on the more sophisticated plane, increased leisure, improved transport and the spread of education have created an unprecedented demand from the lay public, which now constitutes the majority of the gallery's visitors. Unfortunately, an original work cannot be displayed in more than one way at any one time, and the obvious risk is that the demands of scholars, students and the general public may place irreconcilable demands on the collection.

Mr Michael Levey, who since 1973 has been director of the National Gallery, does not accept that this diversity of demand need present an insuperable problem. "Just as a museum ought to have more than one entrance—and we've now got two—so I don't think it need have any one priority. It's there to serve several publics, and I don't think one public need get in the way of another," he says.

Mr Levey's key problem is how to deploy such a vast wealth of resources. "The richness of the National Gallery is beyond doubt; the question is how best to serve up spoonfuls of it without being patronizing. We must devise a policy which is free from condescension, and is interesting to the scholar even at the same time as being helpful to the ordinary person."

Mr Alastair Smith, who heads the educational service of four, sees the general educational policy as aimed at the adult lay public rather than the full-time student of history. For the latter category the gallery provides generous facilities, including a seminar room as well as specialized advice. But tuition is regarded as the prime responsibility of the student's parent institution, and academic staff are encouraged to do some of their teaching in the gallery.

There are notable exceptions to this rule. Special provision is made for Open University students and for some foreign groups. The gallery also accommodates four full-

time students of conservation in its own department.

An important growing arm of the educational service is the provision for children. Activities such as the current "Summertime Quiz", aimed at children from the age of seven, will contribute to the creation of an informed adult public of the future. It has also been designed to provide an intrinsically enjoyable and educational experience.

As with the lunch-time lectures for adult groups, the functions for children have proved very popular and are regularly over-subscribed. Michael Levey is highly conscious of the needs of the gallery's visitors. The new northern extension goes far beyond the provision of exhibition space, including as it does a cinema, seminar room and rest room.

"One simply can't go on looking and looking. The day gets terribly tired, and this is not understood enough. The more you get out of pictures, the more exhausting they are," he says.

He does not regard the gallery's policy as something which can be settled once and for all, but as a constantly evolving process of learning in children can in this way be combined with a study of the students own developing understanding of language.

The exhibition *The Rival of Nature* is open to the public until September 28, admission free.

The author is senior lecturer in art history at Middlesex Polytechnic.

Britain and East Asia, 1933-1937 by Ann Trotter Cambridge University Press, £7.50 ISBN 0 521 20475 5

Diplomacy and Enterprise: British China Policy, 1933-37 by Stephen Lyon Endicott Manchester University Press, £6.50 ISBN 0 7190 0620 1

When diplomatic archives are opened, there is naturally a rush for papers on the big crises, like the Munich and Suez affairs. But in international relations it is in the quieter periods, between the major eruptions, that the foundations are laid for the alignment of forces in the crises. So these two writers, both university teachers of history—Miss Trotter in New Zealand, Mr Endicott in Canada—in their almost identical books on the Far East in the 1930s were wise to take as their subject what Miss Trotter calls the "hazy and apparently featureless interval" between 1933, the year of the Tangku truce which ended the Manchurian affair of 1931, and the outbreak of the Sino-Japanese war in 1937.

In both books the focus is squarely placed on the dilemmas of Britain, a staid and increasingly enfeebled power and yet still the most dominating external force in the Far East. In a situation of mounting tension between the surging nationalists of Japan and China, and with the United States and the Soviet Union, both knowing that their time must come to fill the stage, yet both for the moment unable and unwilling to act.

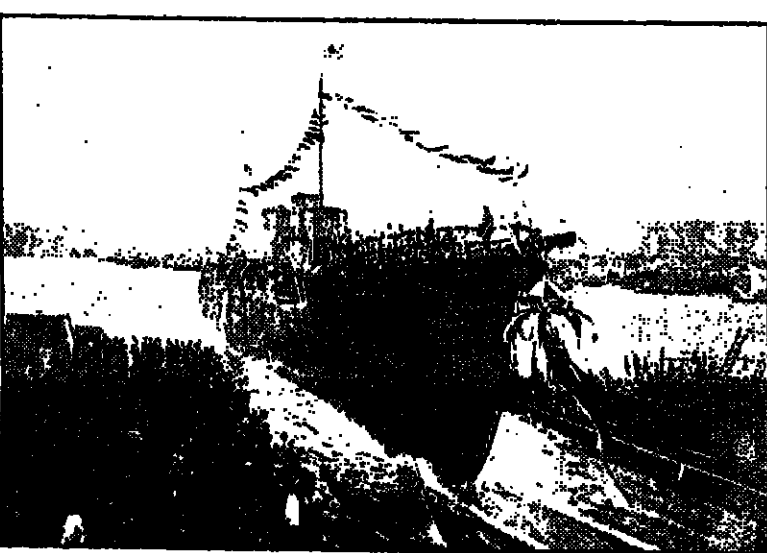
Britain's failure to resolve the major problem of the Far East in the 1930s, the problem, in short, of Japan's place in China, stemmed in part from a schism in British government. Miss Trotter's final chapter is called "The Failure of Britain's Dual Diplomacy", or perhaps it should be triple diplomacy, the three forces being the Foreign Office under Foreign Secretary Simon, Hoare and, after 1935, Eden; the Treasury in the masterful hands of Neville Chamberlain, Chancellor of the Exchequer, and its permanent head, Sir Warren Fisher; and the Service Departments, especially the Admiralty.

But the essential struggle, as both authors make clear, was between a resentful and jealous Foreign Office, with its increasingly unconvincing policy of alienating neither China nor Japan, and the Treasury's determination to seek a rapprochement with Tokyo, partly to further recover from the world economic crisis by cutting spending on the navy, partly to have Japan as a friend, or at least a neutral, in the event of Britain having later to fight Germany in Europe. With the outbreak of the Sino-Japanese war in July 1937, the two conflicting forces were temporarily brought together on the basis of a third and new policy—helping in the economic reconstruction of China. But in 1938, Chamberlain (who had become Prime Minister in May 1937) was energetically seeking once more to mend fences with Japan as another experiment, side by side with that in Europe, in the pacification of a revisionist great power.

But there was also the naval situation limiting Britain's power of manoeuvre, 1934 saw the demise of

## BOOKS

### Appeasing a far eastern power



A new destroyer for the Japanese Navy being launched from Tokyo in 1926.

the world disarmament conference in Geneva, wrecking British hopes of a halt in the arms race. In March, 1935, Hitler made his famous announcement of the re-introduction of conscription in Germany. In June, 1935, he was able to demand and receive the right to build up to 35 per cent of British Commonwealth naval strength. At the same time the Japanese authorities declared their unwillingness to accept any longer the limit of one third of the American and British battleship force as laid down in the Washington conference in 1922. In January, 1936, they withdrew from the London naval talks which were intended to prolong and extend the Washington agreements. It was a

time, too, when the Admiralty in London was making clear to the Cabinet that it would be impossible in wartime to maintain a main fleet east of Singapore and in Europe at the same time.

Miss Trotter tells this painful story in a severely historical style, with neat footnotes from all the available official and private papers. There is a minimum of analysis, some of it self-contradictory. She dismisses "Britain's motivation in her search for a Far Eastern policy" as "primarily economic" and then, on the next page but one, writes that "Britain's policy was a delicate amalgam of commercial, political and strategic factors". Her description of the

"China lobby" as a force in British policy, however, is agreeably realistic. "The merchants in China wanted a 'strong' policy and, provided their interests were not eroded, were not scrupulous about whether this policy involved support of China or cooperation with Japan. The British ambassador to Japan was surprised when he visited Shanghai in 1935, to find the British community and Chinese and inclined to be pro-Japanese."

Stephen Endicott, on the other hand, takes a rather old-fashioned Marxist view (without admitting to it) that these years represented "an interlocking of business and political interests". He goes as far as to write that the "China lobby in Britain succeeded in persuading the government to substitute an opposite policy" (that is, opposite to the Cabinet decision in July 1934 to seek Japanese friendship) "of checking the Japanese influence in China by having closer relations with Chiang Kai-shek and preserving South China as a British sphere of interest". It is a strange argument in view of Endicott's later contention that the "dynamism" which Chamberlain and Fisher, both more pro-Japanese than pro-Chinese, injected into British policy "refutes any notion that foreign policy is the business of the Foreign Office".

But, putting this aside, both these books are useful and authoritative accounts of a vital period of British foreign policy. With their publication it has become impossible to think of British policy in Europe in the 1930s except against the background of the Far East.

F. S. Northedge

### Triumph of cautious pragmatism

The Impact of Hitler: British Politics and British Policy 1933-1940 by Maurice Cowling Cambridge University Press, £15.00 ISBN 0 521 20582 4

Mr Cowling has written a massively detailed study of the "high politics" of British foreign policy during a period of transition when both major parties, or at least their leaders, were fumbling towards a new coherence faced with the collapse of the Versailles Treaty. This period is unlikely to yield any surprises for the historian or the general reader since the sheer volume of available primary and secondary documentation is now overwhelming and covers almost every aspect of the period. Probably wisely Cowling confines his attention to just one dimension—although the case could be made that British responses to Hitler's policy initiatives can be most fully understood in the light of official

manoeuvres concerning the role and significance of Italy in containing Germany. Within this perspective the focus is further narrowed to the impact of Hitler's foreign policy upon a limited number of leading British politicians and officials and their responses to the changing foreign situation.

British internal politics of the period is neglected, because foreign policy was the form taken by party conflict. However, in its turn a major consideration amongst some Conservatives, including Lord Halifax, was that "Hitler must be obnoxious because Labour could not survive because of his policies". Chamberlain hoped that after a brief excursion into foreign affairs he could return to home politics, i.e. to the problem of Labour's apparently growing popular appeal. This was not, of course, the only consideration; it was indeed, simply one amongst many and it is the sheer variety of objectives, aspirations, illusions, subtleties and vanity displayed by Cowling that constitutes the real contribution of this volume to an understanding of the times. No, Hitler was not simply a "fascist villain"; just limited man in a limited situation, he was a

man and elsewhere upon whose good faith or resolution they could or would place only limited reliance since in turn these allies had their own interests to look after.

Contingency and the sheer intractability of the problems are the lessons of Cowling's history: "No attack is intended, the sole aim is to remove misunderstandings based on an implied contradiction between expediency and principle, and to present democratic politicians in a multi-dimensional framework where they display on the fragmented nature of God's handiwork the only rational way of acting politically. The author then makes it clear that rational means working through contingency and accident, not rising above them". It would appear futile to object to this if it means only that politicians must needs work with the material, men and situations, as hand and clearly this is true. But if it means that politicians, top men, top brass and so on, are simply "actors" (Cowling's term) reading from a prepared script or merely waiting on events initiated by others (also, presumably, actors) then it is not obviously true. Politicians can and do initiate—and the anti-hero of this volume is a good example. Hitler may have seen or explained himself as a "sleep-walker" but it was the British who had the nightmares.

One might also add that the curious manner Cowling has of detaching his actors—"seeing him [Chamberlain] in the context of the system of which he was a part"—from the consequences of their behaviour, neglects the consideration that people like Chamberlain, Halifax and Baldwin had played some part over the years in creating the context of British politics. If by 1934 events in Europe made it likely that British security was threatened and this threat was recognized by Baldwin then it is no defence of Baldwin's failure to alert the people to the danger; it is the sheer party advantage and intellectual difficulties of the situation. Chamberlain and Baldwin made the major domestic decisions and, anyway, it is one of the tasks of a politician not simply to conduct himself "in the shadow of 'British democracy'", but if necessary to change the situation or to recognize the changing elements in a situation.

However, as Cowling presents the politicians—and does so on the basis of a truly enormous research effort—they were not there to give a lead but rather to secure party or personal advantage. "In order to be personally nibbling at Lloyd George's 'issue' about which to establish a position." As a senior politician, Hoare needed less to adopt a point of view than to pinpoint a problem." His (Churchill's) prevailing expectation was that office was impossible unless the situation changed. The best way of changing it was to develop an opposition." Of the various ministerial changes following the declaration of war, "Chamberlain's changes reflected the need to sacrifice others in order to save himself". Few of the motives or actions of politicians as presented by Cowling are especially commendable, but it is not the task of the historian to search for precept, or example. He, if Cowling is to be followed, simply records the behaviour of fallible men attending to social arrangements as best they could.

If there are few villains in this volume it is nevertheless true that Cowling does present, if not a "case" for Chamberlain, then at least a picture of a politician with the merit of consistency. This consistency lay in the belief that by 1937 the United Kingdom was sufficiently militarily prepared to prevent Germany from winning by a quick knockout, that the French army would hold and enable the British navy to blockade Germany into submission. This was, of course, the traditional British view that her enemies would be defeated by some of her allies and, due to Hitler's eventual idiosyncrasy, the Russian army actually played the role assigned in the script for the French. As a politician Hitler would come to realize that he could not win, and therefore, had no incentive to strip one else's confidence. Meanwhile it did no great harm to clear up anomalies left over from Versailles and satisfy German grievances widely acknowledged as legitimate. It should be noticed that in this analysis he did not differ significantly from the majority on the German General Staff who feared a long war, and doubted German ability to win a short one.

In the absence of an equally persuasive alternative, together with Chamberlain's obduracy and hold over the Cabinet, the policy of appeasement makes sense and certainly appeared at the time of Munich to be a triumph of cautious pragmatism. Britain did not want to go to war at the behest of a small far-away country. It was the later occupation of Prague that broke the illusion, although there was no strong reason to believe this a real possibility other than the irrational belief that dictators were necessarily irrational. Cowling, in a masterly survey of the leadership of the Conservative party and involved officials, then shows the gradual erosion of Chamberlain's personal position and the realization that "policy would have to be changed if the party was to be saved".

Unfortunately there was no change of policy, other than a growing realization that the League had failed and like it or not Britain would have to accelerate her war preparations. As it was the British army entered the war greatly less prepared than the British Expeditionary Force in 1914 and Churchill replaced Chamberlain following the Neville Chamberlain's standing. "For nothing in particular except the prosecution of a war which was not to be prosecuted."

The Labour Party in all this, according to Cowling, succeeded during the war in putting matters like nationalization, levels of taxation and colonial self-government firmly on the political agenda. In this they were helped by Chamberlain and Churchill who, between them, "destroyed the Conservative Party", and, unwittingly, started the erosion of Empire. Just as in one vision the Empire was gained in a fit of absentmindedness, so in this account it was lost. None of these untoward and unintended consequences, as I catch the lugubrious tone of Cowling's final chapter, can really be understood as an aspect of "God's handiwork". Nothing is gained by retrospectively lambasting Chamberlain's nose, but judging from the tone of this volume Cowling would gladly have had deepened the brains and historical understanding of his actors.

Robert Dowse

## Language acquisition: vital link in English teaching

Cedric Cullingford looks at implications of the Bullock Report on literacy

Education has always been a subject of general interest, but has only recently become a subject of study. This has meant that we are left with wide gaps between the well-measured generalizations of those who have undergone education themselves, feel they know all about it, and the tentative small-scale research of those haunted by so many basic questions which remain unanswered.

The recently published report of the committee of inquiry chaired by Sir Alan Bullock on teaching the use of English is a sign of this dichotomy. It insists again and again on the importance of language and gives backing to those who have written on this in the past, but it lacks the clear perspective that would give teachers an idea of how to implement this enthusiasm. It is a parody of the many books

which do little more than "reproduce" the enthusiasm of the writer for his subject. By now people are accustomed to admit that language and reading are central, but it is not enough just to admit this.

The Bullock Report places great stress on the importance of the teacher, but the practical advice given is hardly a suitable guide for teachers to know what to do. It is the consequences of the committee's being expected by the repeated restatement of the importance of language.

The same rather muddled plea shows itself in the traditional college courses for teachers, and this the Bullock Report roundly condemns. It rightly suggests that there needs to be a "linguistic relationship" between theory and practice, and yet does nothing to prevent a college from introducing a quick course in general linguistics to an already over-extended syllabus.

relish its statement that there is no one approach to the teaching of reading so much that the advice offered remains very flimsy. But where it gives itself away more clearly is in the two examples of courses on language which appear at the end of the chapter on the training of teachers.

These courses contain just those faults which are supposed to be avoided. Both the courses start with generalized linguistic theory, and end, as an afterthought, with the "practical". To be done properly, both courses would need to last for at least two years, and this must remain a bitter hope for most teachers, even to the Bullock committee.

The basic aim, to link theory closely with practice is correct; but to do this there must be a coherent course in which the boundaries are crossed, not by jumping from one to another, but by focusing on a definite area of interest. To quote the report's general introduction, yet again: "It is the fragmentation which prevents theory from being taken into practice within a coherent intellectual framework". It is not enough to apply linguistic theory to practical problems. Colleges must find one area where stu-

dent students of conservation is in its own department.

An important growing arm of the educational service is the provision for children. Activities such as the current "Summertime Quiz", aimed at children from the age of seven, will contribute to the creation of an informed adult public of the future. It has also been designed to provide an intrinsically enjoyable and educational experience.

As with the lunch-time lectures for adult groups, the functions for children have proved very popular and are regularly over-subscribed. Michael Levey is highly conscious of the needs of the gallery's visitors. The new northern extension goes far beyond the provision of exhibition space, including as it does a cinema, seminar room and rest room.

"One simply can't go on looking and looking. The day gets terribly tired, and this is not understood enough. The more you get out of pictures, the more exhausting they are," he says.

He does not regard the gallery's policy as something which can be settled once and for all, but as a constantly evolving process of learning in children can in this way be combined with a study of the students own developing understanding of language.

The two courses offered in the Bullock Report are, therefore, a great disappointment. They are a fragmentary list of possible subjects without any focus. They do not ensure that every trained teacher will include a concern for language as a natural part of his education.

The Bullock Report misses the opportunity to define the central area which should give coherence to a course in language and reading. But then the report is trapped in the very faults it preaches against. It preaches the importance of language at one moment, and then goes on to say that it is not enough to apply linguistic theory to practical problems. Colleges must find one area where stu-

The author is assistant director of studies at Charlotte Mason College.

## A.R. LURIA

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## Automated map making

Elements of Spatial Structure  
by A. D. Cliff, P. Haggett, J. K. Ord,  
K. Bassett and R. Davies  
Cambridge University Press, £6.80  
ISBN 0 521 20689 8

Display and Analysis of Spatial Data  
edited by J. C. Davies and M. J.  
McCallum  
Wiley, £12.00  
ISBN 0 471 19915 X

Location and Space in Social  
Administration  
by Bryan Massam  
Edward Arnold, £6.30 and £3.15  
ISBN 0 7131 5776 3 and 5777 1

It is now ten years since Peter Haggett's *Locational Analysis in Human Geography* established quantitative-theoretical geography as a recognizable part of British geography. This trend towards quantification is usually interpreted as part of a movement in geography from description to analysis and the early theoretical developments were almost exclusively spatial or even simply geometric in nature. Hence much of the work relating to this school of thought in both undergraduate courses and the research literature has come to be known as "spatial analysis". After its initial rapid growth within geography this spatial school has stabilized in the last few years as further new developments in more behavioural and politically conscious approaches have drawn their quota of new adherents to the discipline. However these three books are all explicitly spatial analysis and attempt to contribute to the spatial school.

The University of Bristol has been widely recognized as the centre of the diffusion of these new trends in geography through the work of Michael Chisholm, Peter Haggett and David Harvey. *Elements of Spatial Structure* reinforces this viewpoint as it reports on the work of five Bristol researchers in the late 1960s and early 1970s. Although Haggett is one of the five authors, his book should not be considered a revision of his *Locational Analysis*, being in some ways a much more ambitious book as it attempts to lay bare "certain basic and primitive properties of space, elements upon which more sophisticated models must ultimately depend".

However it is not meant to be a

definitive standard reference on elements of spatial structure and the authors are very careful to point out that the work is in no way complete, but simply represents the fruits of their efforts to date. For instance the problem of invariance of the parameters of some smoothing techniques to orientation of the coordinate system is left unsolved in chapter four and in chapter ten the general forecasting models (STARIMAR) parameter estimation procedures are noted as a subject for future research. However there are very many more instances where the authors have broken new ground in spatial analysis.

They have achieved this in three ways. First they have introduced and adapted time series and forecasting approaches into a spatial context. Secondly they have developed the statistical apparatus required to use these adaptations correctly. This is most fully developed in part three in terms of deriving the sampling distributions of measures of spatial autocorrelation and parameter estimation for space-time forecasting models. Thirdly they have introduced parts of the statistical literature and applied it to familiar geographical problems. Geographers have long bemoaned the lack of statistical interest in their problems without fully knowing the statistical literature. Many have suspected that there was more relevant material from this source than geographical authors have been aware of. A good example of this is the introduction in chapter three, of the Whitworth and Cohen models from the literature on "spacings" which enables the authors to dismiss the familiar rank size rule as "having little more than historical interest". A major objective of the entire approach is a quantitative approach to geography was that it would make the discipline more rigorous in its research methods. *Elements of Spatial Structure* fully justifies this expectation.

While geography was becoming more quantitative, cartography was becoming more automated. Both developments have become closely related in terms of dependence on computers and common interest in map properties. This is simply because automated map making requires the production to be made explicit in a quantitative sense. Hence there has been a parallel trend towards more rigorous consideration of map properties often overlapping with the more direct geographical interest in spatial analysis. *Display and Analysis of Spatial Data* is a volume of 22 papers written by participants in a NATO Advanced Study Institute on this topic held in Nottingham in 1973. The papers are divided into three groups relating to theoretical aspects, automated cartography and practical applications. There is some overlap with the previous book in the theoretical parts where Cliff and Ord discuss spatial autocorrelation again and there is a paper by Tobler on linear operators.

Each chapter is composed of three parts. Unit 1 on complex numbers gives a good introduction to the elementary definitions. In unit 2 on continuous functions the discussion on the continuity of a polynomial function might have been enlarged. It is followed by the bold statement that "any rational function is continuous" which may not be remembered (the earlier statement that the domain of a rational function does not include any zeros of its denominator). Unit 3 covers differentiation. The development is made difficult and clumsy by presenting a variety of which can be taken by students without any knowledge of partial differentiation. The result is that the classical Cauchy-Riemann equations come near the end of this unit.

However this volume is very different from the *Elements of Spatial Structure*. The most obvious difference is in its range of approaches reflecting researches from six countries in several disciplines. We are reminded that spatial analysis is much more than a dialogue between geography and statistics. In fact many will find the three papers by geographers in the theoretical section most interesting as they describe work on "regionalized variables" whose theory has been developed into the Kriging optimum interpolation approach in isoline mapping. The papers on the automated cartography range from a review of line printer maps by Coppock to consideration and solution of problems in depicting relief by Sprunt with finally a description of several computer graphics systems including a description of the Harvard University programmes. Unfortunately the final set of papers on practical applications do not constitute a very coherent group since being more related to the earlier theoretical papers than applying any computer cartography. None the less this volume represents both an impressively broad coverage of the state of the art in this field and reflects previous failures to integrate theoretical work as evidenced by the lack of referencing among researchers from different disciplines. I expect that the institute and this volume will be instrumental in breaking down this academic isolation.

*Location and Space in Social Administration* is much more specialized than the other two books. Much of the discussion consists of applications of parts of spatial analysis to the design of administrative areas. Numerous measures of shape are reviewed to derive an index of spatial efficiency and several allocation-location models are described and applied. However the subject matter requires more than simply spatial analysis since, in practice, social and political issues transcend "spatial efficiency" as a school in geography has been accused by its critics of being rather naive when it comes to political matters and unfortunately this book supplies evidence to support this view. The topic of "control and decision making" is relegated to the final chapter where a rather huge literature on the relations of politics and administration is presented in 15 pages. When geographers stay within the confines of spatial elements and computer graphics they can avoid such political issues in their work but when they start clearly in the realm of public policy, the implications of their work under varying political assumptions must be made explicit. Massam's failure to adequately cover these political aspects makes his book particularly disappointing for those who feel that spatial analysis must begin to be more practical while continuing the development of its theoretical bases.

P. J. Taylor

## Topology and complex analysis

Complex Analysis, M332 13 and M332 46  
edited by R. J. Knight  
Open University Press, £4.45  
ISBN 0 335 05550 8 and 05551 6

The authors have tried in the complex analysis to produce a more readable book. Despite this, there are many errors in the three volumes. The authors obtain a general form for Cauchy's theorem for star-like domains very neatly. There is a good selection of carefully graded examples in each section so that the student is led to some powerful results. However, some results are quoted without any proof.

The books are garrulous at times, and though this may make study easier for Open University students, it does tempt the authors into making long statements some of which are actually incorrect. Since

students may wish to consult other texts it would have been desirable for the authors to point out that amplitude is an alternative usage to argument, their convention for  $\log z$  and  $\text{Log } z$  is the opposite of that used by some other books and complex plane is sometimes called the Argand plane. Each volume covers a narrow field and university students may find them expensive.

Each text is composed of three parts. Unit 1 on complex numbers gives a good introduction to the elementary definitions. In unit 2 on continuous functions the discussion on the continuity of a polynomial function might have been enlarged. It is followed by the bold statement that "any rational function is continuous" which may not be remembered (the earlier statement that the domain of a rational function does not include any zeros of its denominator). Unit 3 covers differentiation. The development is made difficult and clumsy by presenting a variety of which can be taken by students without any knowledge of partial differentiation. The result is that the classical Cauchy-Riemann equations come near the end of this unit.

Unit 4 is on integration. Theorem 4/4 and all deductions from it are not necessarily true despite the reference to Spivak. It is regrettable that the context between the definition of a contour integral as given and the more obvious Riemann sum form is not discussed. Cauchy's theorem is the subject of deduction of Cauchy's formula. It is made to depend on an unproved lemma for integration by parts of contour integrals. It would have been instructive to justify differentiation under the integral sign with respect to a parameter given suitable conditions and use this result to establish the formulae. Taylor Series in unit 6 is well presented. However, problem 6 (d) is not a theorem. The integral sign is used as the term-by-term integration is not justified. An appeal to uniform convergence with respect to  $z$  is required here, but the text does not cover uniform convergence and it would have been better to postpone the problem to a later course unit.

Barry Spain

Selenium  
by R. A. Zingaro and W. C. Cooper  
Van Nostrand Reinhold, £25.20  
ISBN 0 442 29575 8

The discovery of new elements, such as selenium, silicon and thorium represents only a small fraction of the contribution of Jöns Jakob Berzelius to chemistry. It is perhaps as well that, in naming selenium for the moon, in an association with the recently discovered tellurium for the earth, he mixed his Greek and Roman mythologies—Lunus sounds a much less attractive name for an element.

Selenium exhibits photovoltaic action, where radiation is converted directly into electricity, and photoconductivity where its electrical resistance decreases with increased illumination; it converts alternating current to direct current, and it is a p-type semiconductor. Thus photo cells, exposure meters, solar cells, rectifiers, X-rayography and electronics all use selenium, and indicate its considerable usefulness to modern science and society.

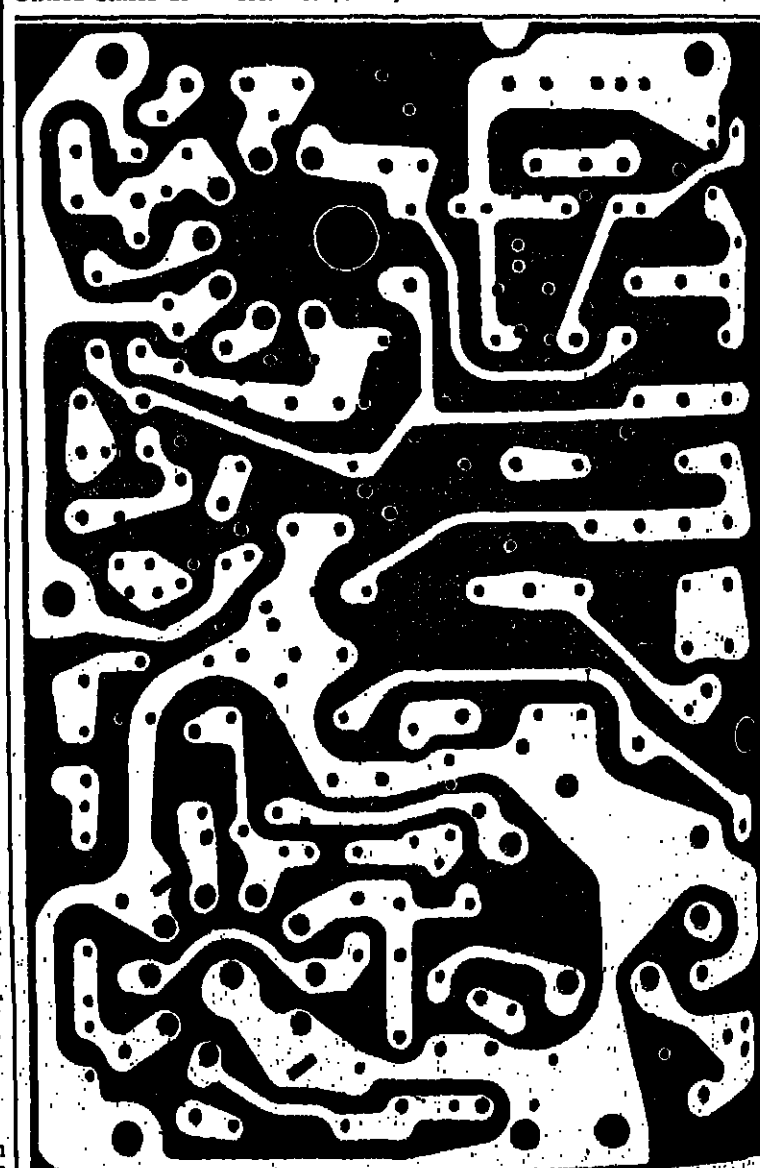
The Franz-Keldysh shift for an exponential effect is an important factor in photoelectronic properties of amorphous selenium; selenium deficiency in the diets of pigs and poultry causes annual losses in the United States of America of \$55m;

and the most brilliant red glass of the glassmaker, the selenium ruby, is coloured by the presence of a solid solution of cadmium sulphoselenides.

The editors have gathered together a team of authors who can write on these, and equally diverse aspects of selenium, with authority. Sixteen chapters written by about two dozen authors cover all that is of interest in the science and even the art of selenium, with over 2,500 literature references. It is a remarkable reference work, covering a wide range of topics which include the history, occurrence and properties of selenium, its structure and interaction with light of phonons, its optical and electrical properties, and its use in agriculture, glass, rubber and plastics and its metallurgical aspects and uses. The book has a very good index and covers the entire literature of selenium up to 1970.

With a potential readership of chemists, physicists, geologists, electrical and chemical engineers, metallurgists, biochemists and toxicologists, as well as those interested in agricultural sciences and the glass, rubber, plastics, electronics and photocopying industries this volume will be a valued authority for many years ahead.

Edward Aul



An example of the printing of electronic circuits by the screen process. From "Screen Printing" by J. I. Diegelstein, Evans Brothers, £5.55.

## Calculus of variations

Analytical methods of optimization  
by D. P. Lawden  
Scottish Academic Press, £3.50  
ISBN 7011-2077 0

Professor Lawden has brought his long experience to bear on the problem of presenting that rather diffuse mass of material, the classical calculus of variations, in a form which is appropriate for third-year undergraduates and postgraduate students interested in control theory. The emphasis is on techniques and methods, although he has made a serious attempt to maintain a logical argument by trying to limit the generality of statements instead of the iniquitous (but fortunately becoming less common) strategy of making general statements without proving them. The title emphasizes the exclusion of numerical methods. Fro

Professor Lawden is on the staff of those who believe that a mathematical model that is simple enough to allow analytical solution is the best way to get a good idea of the behaviour of the actual system, but also of the usefulness of the model.

The first kind of recording we have seen is of conversations or group discussions on which the students have been asked to write down their views. The students are invited to identify the aims of the teacher, bringing out the ideas and methods of the course. The teacher's role is to organize the discussion, to bring out the ideas and methods of the course. The teacher's role is to organize the discussion, to bring out the ideas and methods of the course. The teacher's role is to organize the discussion, to bring out the ideas and methods of the course.

C. W. Kilham

Helen Simons looks at what changes have occurred to give undergraduates a greater say in their education, eight years after the troubles of '68

## Consultation or confrontation?

Staff-student committees were the standard answer to student demands for a more democratic and participative role in the late 1960s. And now, student representation at decision-making level is common enough in universities and polytechnics. But not surprisingly it was not long before these committees found themselves in a state of stagnation, never expected to produce solutions for curricular problems. Student representation, it was quickly discovered, was a very different matter from real participation.

The fault may not lie, of course, with committees *per se*, but rather with how such committees are organized and controlled. The kind of issues that staff consider can legitimately be discussed, and perhaps with the relative limitations in students' experience and background knowledge. In many cases, the level of discussion is too distant from the students' own experience of teaching and learning. Problems can too easily be shelved or deferred rather than being faced directly. In response to this difficulty, some departments have set up special meetings to tackle teaching and learning problems. In a few cases, these have evolved into a critique of existing courses initiated by staff and led to changes initiated by students.

Opportunities for students to participate at a different level have come with the increased range of choice available in the undergraduate curriculum. Extension of the range of third year options and the range of projects in the special honours degree may have been the first step.

More recently, the introduction of modular or course unit structures, and interdisciplinary degrees which offer choice, have created opportunities for students to choose different paths, if not their total degree pattern; or to change courses in mid-career, thus developing interests. The process of "planning your own curriculum" is taken to its logical conclusion in the school of independent studies at Lancaster University and in the DiPHE at the North East London Polytechnic.

But an alternative which does

not involve such radical structural change is possible within the existing departmental framework. Two years ago, for instance, the sociology department at the University of Keele substituted workshops for the lecture-tutorial as the basic unit of learning and opened up the choice of curriculum so that students could effectively plan their degree course to match their current or developing interests.

Workshops consist of groups of six to 12 students with a tutor. Each workshop meets for a seminar period of up to two hours every week during the university year which is divided into two semesters. Each student takes two workshops of his choice each semester. The work of the group is usually focused on a "problem" which students play some part in defining and they each contribute in their own way to its solution both inside and outside the seminar.

Tutors act as resources for background reading, give occasional assessments, if needed, and chair the discussions. Towards the end of the semester the group prepares a statement which is shared and discussed with other students and staff at a one-day conference. Students also write individual essays which are assessed by the tutor. The final assessment, however, is still based on examinations. The whole idea evolved from a discussion meeting—a "sub-committee" set up to encourage open criticism of courses.

Although more students now have the opportunity to choose what they want to learn, the same flexibility is not always extended to choice of learning style. That people learn in different ways and at a different pace, is widely recognized. Some students are inspired to "read the subject" by the traditional method of sitting at the feet of an authoritative figure; others gain more from informal sessions. While some students find the one-to-one tutorial, others find it embarrassing or over-dependent on satisfactory personal interaction. Group discussion may provide an ideal learning medium for the articulate or confident but be intimidating for the quiet or shy who find their way far more easily

through lectures, reading and the writing of essays.

But obvious though this is, few institutions can in practice offer much real scope for students to choose which learning style best suits them.

Arguments against providing students with a range of alternative learning approaches usually centre on the high cost in teacher time. But there are means of overcoming this problem by deploying staff resources differently. For example, lecture notes and other background material for each course could be made available to students and lectures given on request; the one-to-one tutorial could be replaced by group projects, and the role of each teacher coincidentally, this extends the range of learning styles—students may learn from each other as well as from a member of staff; group projects could be introduced as an alternative to individual projects. In some instances, students of different years could combine for seminars—extending again the range of learning opportunity. Of course, there will be all sorts of difficulties in any attempt to increase the students' range of choice of learning methods. But, assuming that choice is likely to increase motivation and hence give students an opportunity to improve the quality of their learning, one could argue that the advantages outweigh the drawbacks.

The same considerations, incidentally, could well apply to university lecturers' salaries. None of them, one suspects, are equally happy with the customary traditional lecturer's role; some, for example, will be more at ease than others in the small group teaching situation. Some members of staff may be more personally tutors than others and some better research advisers. So there might be a good case for capitalising on individual staff strengths.

In retrospect, it is easy to see that student representation is fundamental to the real issues of teaching and learning. Participation to be significant it has to be based on substantive issues to which students can contribute.

The author is a member of the Nuffield Group for Research and Innovation in Higher Education.

Clive Carré writes the third article in our series 'The Active Student'.

## Audiotapes: a chance to listen

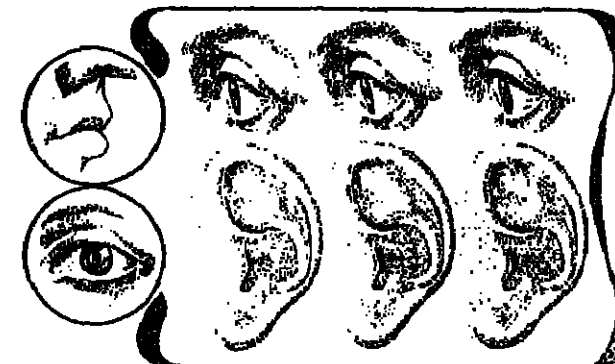
The traditional role of audio-visual aids in education has been to support the lecturer in his delivery. This cautious injection into what is still essentially verbal communication is a safe, conservative way of introducing a new technology into the classroom.

The development and extended use of audio-visual aids may be regarded as an acceptance of the nature of media and of present-day learners. On the other hand, media can be used in ways which shift responsibility of learning on to the student's shoulders. Recent moves in this direction minimize the lecturer's role as broadcaster, and introduce a wide range of different types of learning experiences for the students. The consequences are two-fold: banks of relevant resource materials have to be produced, but also a change in role for the tutor demands the acquisition of new technical skills.

Audiotapes and a sample of the ways in which such tapes have been used in the Nuffield-sponsored Science Teacher Education Project will serve here as an illustration of the potential of sound recordings. The first kind of recording we have seen is of conversations or group discussions on which the students have been asked to write down their views. The students are invited to identify the aims of the teacher, bringing out the ideas and methods of the course. The teacher's role is to organize the discussion, to bring out the ideas and methods of the course. The teacher's role is to organize the discussion, to bring out the ideas and methods of the course.

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C. W. Kilham



## SISCON: taking a broader view of teaching science

The objective of the Science in a Social Context Project (SISCON) is to promote the teaching of science at first degree level so that it takes due account of all aspects of science and its interactions with society and is not solely concerned with inculcating a purely technical expertise.

Accepting this objective, one must then ask: What do we teach? To whom do we teach? And how do we teach it? Clearly, these questions are inter-related and cannot be answered independently. In considering them it soon becomes apparent that others must be added: Who is to do the teaching? To what extent can teaching and learning be separated?

To attempt to solve such a complex connected set of problems in a single department or a single institution is difficult enough, but the project's concern is to find an approach which will be acceptable to all institutions of higher education in this country—significantly more difficult.

We recognized early that no one approach, no single teaching-learning resource would be acceptable to all users in so wide an audience and that we should therefore strive for the maximum flexibility. We also soon realised that although in some cases the sort of teaching we envisaged could be provided by specialist groups—history and philosophy of science departments, science studies units and the like—in general the teaching would have to be done by established science lecturers, if it was to have the impact we desired: to change all science degree courses. We needed to provide the means both to teach the teachers and to reach the students. Or perhaps this requirement could better be formulated: to provide the means for both teachers and students to learn together.

To engage scientists in this teaching seemed to us to have an incidental and very important advantage: relative ease of communication. Disciplines have grown so far apart that, for example, the economics lecturer experiences difficulties (arising from differences in language and in approach) in getting through to, say, the physics student. Our hope is that the scientist, having first had to master the subject matter, will be able to perceive it and present it in a manner which science students will more readily understand.

Furthermore many social problems of concern to scientists are essentially interdisciplinary: if we set up new departments to teach these topics we may be creating a new specialism and losing sight of the interdisciplinary approach which may well be essential. The ideal approach could be team teaching involving natural scientists, social scientists—what an absurd division—and "science" science specialists working together.

With these considerations in mind we decided to concentrate principally on two activities: to publish a wide range of appropriate teaching/learning materials and to arrange meetings, conferences and schools for interested teachers. The materials, still in experimental form, are being produced in units. A single unit is intended to provide a student with sufficient work to occupy one quarter to one third of his or her total working time over a period of three weeks. Conceivably the same unit could occupy one tenth of the student's time for 10 weeks, but this would not be

student is not sufficiently engaged, the parent department sees the subject as a minor, insignificant part of the course and such low esteem due account of all aspects of science and its interactions with society and is not solely concerned with inculcating a purely technical expertise.

Our units are not written on the pattern of a science textbook but adopt the form more usual in the arts. The units are flexible and can be augmented by lectures and tutorials. They provide sufficient material for the teacher and student to select what is appropriate for a particular course or level of study. They are also flexible in assembly; the units presently undergoing trial include such titles as "Science, Technology and the Modern Industrial State", "Society and Food", "Science and the Environment", "The Sociology of Science", "The Limits to Growth".

Fifteen units exist, a further five are being printed—all produced since the Project started in October 1973 and a further 20 will be available by the time our funds run out in September 1976. Therefore a department could take several Siscon units—on, for example, such topics as Galileo, social responsibility, scientific rationality, energy resources, the economics of materials, and to them topics on which it may already have expertise within its own ranks, say, on the problems of nuclear power or on atmospheric pollution and include suitable case studies: on the siting of a nuclear power station, on concord, on cyclamates, on the physical sciences. A quite different mix might be assembled for students in the life sciences.

The more of learning, we hope, will be implicit in the Siscon units: intensive student participation—reading, writing, discussion—supported by minimal lecturing. The teacher's role is seen as that of a guide rather than an instructor. In our view, unless students participate very actively in the teaching/learning process in this subject area, it cannot be successful. A student of the social aspects of science cannot be treated in the same way as the study of thermodynamics. Some element of subjectivity is essential; the students must see themselves as involved—not necessarily the same thing as committed. One of the Siscon member institutions is investigating devising suitable projects in alternative technology as one way of increasing student participation.

It is too early yet to gauge how successful this approach is: the first trial units were only issued last October, the latest as recently as last month. But we have had some feedback from people who have offered to try them out, including some from abroad, and from a few of the students they have tried them out on.

Even from this limited return we have learnt something: that scientists have been caught unawares by a simple and obvious fact of teaching life. To run these courses cheaply, necessary to make materials and equipment must be provided for laboratory classes. It is not reasonable to stipulate certain readings as essential for a class session if they are not available in a cheap edition which each student can sensibly be expected to buy) unless the department provides a sufficient number of copies; the departmental library must become the scientist's in a social context "laboratory".

Bill Williams

The author is project coordinator of the Science in a Social Context







# The future of the colleges

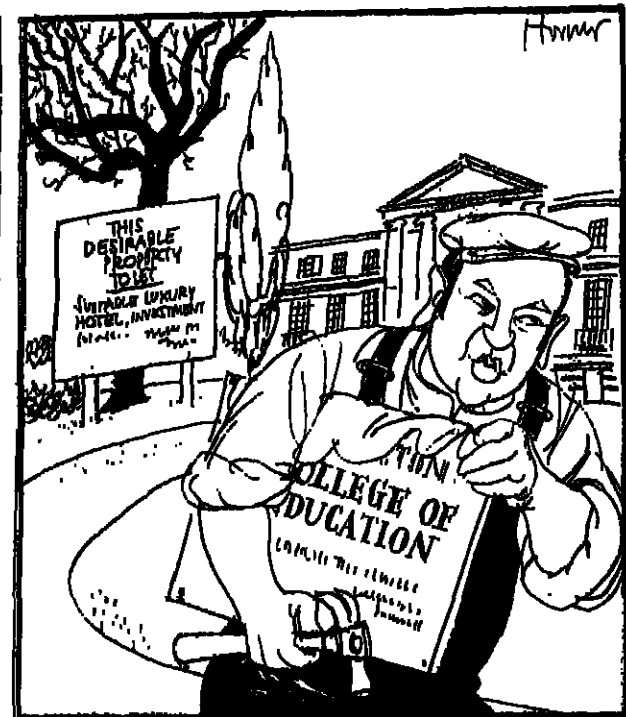
Student targets for 1981 set by the DES

NORTH		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Bode; St Hild's	500	Agreed
Charlotte Mason	300	Agreed
Neville's Cross	500	Agreed
Sunderland Polytechnic (Sunderland College of Education and Polytech- nic Education Depart- ment)	500	Agreed
Alnwick	—	Initial Training to be discon- tinued
Darlington	—	Initial Training to be discon- tinued
St Mary's Fenham	600	Near agreement
Newcastle Polytechnic (City of Newcastle and Northern Counties)	650	Under con- sideration
Northumberland	750	Under con- sideration
Teeside Polytechnic (Middleton St George and Teesside Day)	400	Under con- sideration

YORKS/HUMBERSIDE		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Bratton Hall	350	Agreed
Doncaster; Scawby Huddersfield Polytechnic	500	Agreed
Education Department	300	Agreed
Hull; Endsleigh	600	Agreed
Lady Mabel	425	Agreed
Leds Polytechnic (City of Leeds, James Graham and Polytechnic Education Department)	1,000	Agreed
Margaret McMillan; Bingley; Ilkley	1,000	Agreed
North Riding	850	Agreed
Sheffield Polytechnic (City of Sheffield and Tinsley/Thorncliffe)	1,000	Agreed
St John's York; Ripon Trinity; All Saints Wentworth Castle	800	Agreed
	750	Initial training to be discon- tinued

NORTH-WEST		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
C. F. Mott; Ethel Wormald	750	Agreed
Chester	600	Agreed
Crows; Alsager	1,100	Agreed
Edge Hill	800	Agreed
Liverpool Polytechnic (I. M. Marsh)	300	Agreed
Manchester Polytechnic (Didsbury and Poly- technic Education Department)	—	Initial training to be discon- tinued
Manchester Day; Mother; Elizabeth Oakell	1,850	Agreed
Padgate	575	Agreed
Preston Polytechnic (Chorley and Poulton)	550	Agreed
St Martin's	550	Agreed
Christ's; Notre Dame; St Katherine's	1,250	Near agreement
De La Salle; Sedgely Park	850	Near agreement
F. L. Calder	300	Under consideration

WEST MIDLANDS		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Birmingham Polytechnic (Aston, City of Birmingham and Bordesley)	1,000	Agreed
Coventry (Warwick University)	700	Agreed
Madley	850	Agreed
Newman	700	Agreed
West Midlands	600	Agreed
Worcester	650	Agreed
Radbrook	—	Initial training to be discon- tinued
St Paul's Rugby	—	Initial training to be discon- tinued



SIGNS OF THE TIMES

EAST MIDLANDS		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Shearston	450	Under con- sideration
Hereford	—	Initial training to be discon- tinued
St Peter's Saltley Wolverhampton Polytechnic (Wolverhampton Day and Dudley)	700	Under con- sideration

EAST ANGLIA		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Bishop Grosseteste Lincoln	400	Agreed
Bishop Lonsdale Derby	450	Agreed
Eaton Hall	500	Agreed
Loughborough (Lough- borough University)	600	Agreed
Northampton	500	Agreed
Trent Polytechnic (Clif- ton and Polytechnic Education Department)	950	Agreed
Matlock	500	Agreed
Kesteven	—	Initial training to be discon- tinued
(Peterborough Out- post)	135	Under con- sideration
Mary Ward	—	Initial training to be discon- tinued
Leicester Polytechnic (Leicester)	500	Under con- sideration

GREATER LONDON		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Keswick Hall	700	Agreed
Homerton	650	Near agreement

SOUTH WEST		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Avery Hill Borough Road; Maria Gray	670	Agreed
Central London Polytechnic (Sidney Webb)	900	Agreed
Froebel; Southlands Whitechapel; Digby Stuart	380	Agreed
Kingston Polytechnic (Gipsy Hill including outpost)	1,500	Agreed
Middlesex Polytechnic (Trent Park)	500	Agreed
North London Polytechnic	500	Agreed
Education Department Philippa Fawcett	290	Agreed
Furzedown	690	Agreed
South Bank Polytechnic (Battersea)	500	Agreed

OTHER SOUTH EAST		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Bedford; Bedford PE	800	Agreed
Berkshire	700	Agreed
Brighton Polytechnic (Brighton)	600	Agreed
Christ Church Canterbury	630	Agreed
Eastbourne; Chelsea PE	800	Agreed
Seaford	450	Agreed
Newland Park	500	Agreed
Nonington	—	Agreed
Oxford Polytechnic (Lady Spencer Churchill)	400	Agreed
Portsmouth Polytechnic (Portsmouth)	500	Agreed
Shoreditch	700	Agreed
Wall Hall, Balls Park	700	Agreed
Putteridge Bury	—	Initial training to be discon- tinued
Saffron Walden	—	Initial training to be discon- tinued
Sittingbourne	—	Initial training to be discon- tinued
Brentwood	450	Near agreement
King Alfred's Winchester; Sarum St Michael	900	Near agreement
La Sainte Union	600	Near agreement
Milton Keynes	400	Near agreement
Bishop Otter; Bognor	750	Under consid- eration
Culham	—	Under consid- eration
Hockerill	—	Under consid- eration
St Osyth's	300	Under consid- eration
Westminster	450	Under consid- eration

SOUTH WEST		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
St Mark and St John (including Camborne outpost)	580	Agreed
Bath; Newton Park; Bristol Polytechnic (Redland and St Matthias)	1,400	Agreed
Rolle	600	Agreed
Weymouth	500	Agreed
St Luke's Exeter (Exeter University)	500	Near agreement
St Paul's Cheltenham; St Mary's Cheltenham; Gloucestershire Sarum St Michael (See Other South East Region)	1,000	Near agreement

WALES		
1981 Provisional Target of Teacher Training Places	State of negoti- ations about future Training Places	
Details to be announced	—	—

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### Universities

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UM ARDOIDEACHAIS  
LIMNEACH

The first phase of development within recently constructed facilities on the 120-acre riverside campus is now under way and staff are being recruited to develop and implement a variety of programmes ranging from specialist short courses to degree and post-graduate.

### LECTURER/ASSISTANT LECTURER IN COMMUNICATIONS

Person appointed will be primarily involved in the development and implementation of modules in written and oral communication. Relevant teaching and/or practical experience is required. Proficiency in the use of graphics and other visual aids in communication would be of advantage. A primary honours degree or equivalent professional qualification is a basic requirement.

### LECTURER IN ORGANISATION AND METHODS

To participate in the development of the Administrative Systems programme particularly in the area of management services. To design, develop and teach courses in the theory and practice of Organization and Methods. Applicants should have several years' experience in a management services function. The minimum academic qualification is an honours degree.

**SALARY:** Lecturer, £4,722-£5,138  
Assistant Lecturer, £3,542-£4,498  
Additional annual allowances of £100 marriage and £70 per child together with other benefits. Application material available from Personnel Office, National Institute for Higher Education, Limerick, to be completed and returned by Friday, 26th September, 1975.

### THE OPEN UNIVERSITY POST-EXPERIENCE COURSES UNIT

**COURSE ASSISTANT**  
Applications are invited for the post of Course Assistant in the Post-Experience Courses Unit. The work will include assisting in the maintenance of the Post-Experience Courses Unit, the design of learning materials, and the delivery of short courses on a variety of subjects. Applicants should preferably be graduates in the social sciences or education or teachers; interested in the design of learning materials, and with experience in the design of learning systems. Salary will be on the Course Assistant scale from £1,650 to £2,150 (under review). The appointment will be for three years. Application forms and further particulars are available from: The Registrar, The Open University, Milton Keynes MK8 6AL. Closing date: 10.9.75.

### THE QUEEN'S UNIVERSITY OF BIRMINGHAM

Applications are invited for the post of DIRECTOR OF EXTRA-MURAL STUDIES to commence in April, 1976. Salary within £3,000-£4,000 p.a. Further particulars available from the Registrar, to whom applications and copies of three references should be sent by Friday, 26th September, 1975.

### ULSTER: THE NEW UNIVERSITY EDUCATION CENTRE

**LECTURER IN EDUCATION**  
Applicants should have advanced qualifications in education or a related discipline, a specialized knowledge of educational research, and a research interest in some aspect of child study and/or the design of learning systems. School teaching experience is desirable. Salary scale (excluding Thrift/Savings) (with FRS/US\$) £2,118-£2,896 per annum (under review). Preference will be given to an appointment at the lower end of the scale. Further particulars may be obtained from The Registrar, The New University of Ulster, Coleraine, Northern Ireland (quoting Ref: 75/66/83), to whom applications and three references, should be returned not later than 30th September, 1975.

### THE UNIVERSITY COLLEGE OF WALES ABERYSTWYTH

Applications invited for the post of DIRECTOR OF EXTRA-MURAL STUDIES to commence in April, 1976. Salary within £3,000-£4,000 p.a. Further particulars available from the Registrar, to whom applications and copies of three references should be sent by Friday, 26th September, 1975.

### THE OPEN UNIVERSITY FACULTY OF ARTS ARTS STAFF TUTOR POSTS

Arts Generalists or Specialists in the following subjects: Art, Architecture, Design, History, Literature, Music, Philosophy, Science, Social Studies, and Technology. Applications are invited for seven tenured posts of Staff Tutor in Arts, one attached to each of the following regional offices: South West: Bristol; West Midlands: Birmingham; East Midlands: Nottingham (specialist preferred); Yorkshire: Leeds (specialist preferred); North: Newcastle-upon-Tyne; Scotland: Edinburgh; South East: East Grinstead. Candidates should have good academic qualifications in one or other of the disciplines of Art, History and Architecture, Classical Studies, History, Literature, Science, Music or Philosophy. Well-qualified Arts generalists will also be welcome to apply to assist in the process of reviewing the structure and content of current development courses. The duties of the Tutors include the introduction of new students to the study of the subject, the development of undergraduate services, and the provision of a wide range of audio-visual material. Applicants should have a degree and professional qualifications in the subject of the discipline of the University's Superannuation Scheme. Further particulars and application forms are available from: The Personnel Manager (ABTP), The Open University, Milton Keynes MK8 6AL. Closing date: 26th September, 1975.

### AUSTRALIA LA TROBE UNIVERSITY Melbourne

**LECTURER/SENIOR LECTURER IN MICROBIOLOGY**  
(two positions)  
Preference will be given to candidates who possess strong academic qualifications and research experience in microbiology and teaching and research in any field of microbiology. The Department of Microbiology is a new department in the Faculty of Science and offers a course in general microbiology leading to a Bachelor of Science degree. The course is intended to provide a broad and balanced training in fundamental microbiology and the necessary practical skills required for careers in such fields as research, industry or teaching. Candidates are invited to apply to the Department of Microbiology, La Trobe University, Bundoora, Victoria 3086. Closing date: 10th October, 1975.

### BATH THE UNIVERSITY LIBRARY

**ASSISTANT LIBRARIAN/INFORMATION OFFICER**  
Applications are invited for the post of Assistant Librarian/Information Officer in the University Library. The successful candidate will be responsible for the day-to-day running of the library and will be expected to develop the library's services in the field of information science. The post is a full-time position and will involve a significant amount of travel. Salary is £3,000-£4,000 p.a. Further particulars and application forms are available from: The Registrar, The University of Bath, Bath BA2 9AT. Closing date: 10th October, 1975.

### BIRMINGHAM FACULTY OF COMMERCIAL AND SOCIAL SCIENCES

**LECTURER IN SOCIAL SCIENCES**  
Applications are invited for the post of Lecturer in Social Sciences. The successful candidate will be responsible for the day-to-day running of the department and will be expected to develop the department's services in the field of social sciences. The post is a full-time position and will involve a significant amount of travel. Salary is £3,000-£4,000 p.a. Further particulars and application forms are available from: The Registrar, The University of Birmingham, Birmingham B15 2TT. Closing date: 10th October, 1975.

### AUSTRALIA THE AUSTRALIAN NATIONAL UNIVERSITY UNIVERSITY LIBRARY ASSOCIATE LIBRARIAN

Applications are invited for the post of Associate Librarian in the University Library. The successful candidate will be responsible for the day-to-day running of the library and will be expected to develop the library's services in the field of information science. The post is a full-time position and will involve a significant amount of travel. Salary is £3,000-£4,000 p.a. Further particulars and application forms are available from: The Registrar, The Australian National University, Canberra ACT 2601. Closing date: 10th October, 1975.

### AUSTRALIA MONASH UNIVERSITY Melbourne

**DEPARTMENT OF ADMINISTRATIVE STUDIES  
LECTURERS—TWO POSITIONS**  
For teaching mainly at the graduate level and for supervising research. The Department currently offers a course in Administrative Studies leading to a Bachelor of Commerce degree. The course is intended to provide a broad and balanced training in fundamental administrative studies and the necessary practical skills required for careers in such fields as research, industry or teaching. Candidates are invited to apply to the Department of Administrative Studies, Monash University, Victoria 3168. Closing date: 10th October, 1975.

### AUSTRALIA AUSTRALIAN NATIONAL UNIVERSITY

**RESEARCH SCHOOL OF PHYSICAL SCIENCES  
RESEARCH FELLOW/SENIOR RESEARCH FELLOW**  
Applications are invited for the post of Research Fellow/Senior Research Fellow in the Research School of Physical Sciences. The successful candidate will be responsible for the day-to-day running of the school and will be expected to develop the school's services in the field of physical sciences. The post is a full-time position and will involve a significant amount of travel. Salary is £3,000-£4,000 p.a. Further particulars and application forms are available from: The Registrar, The Australian National University, Canberra ACT 2601. Closing date: 10th October, 1975.

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### AUSTRALIA UNIVERSITY OF NEW ENGLAND ASSOCIATE LIBRARIAN LECTURER IN EDUCATION CENTRE FOR EDUCATIONAL STUDIES

Applications are invited for the post of Associate Librarian in the University Library. The successful candidate will be responsible for the day-to-day running of the library and will be expected to develop the library's services in the field of information science. The post is a full-time position and will involve a significant amount of travel. Salary is £3,000-£4,000 p.a. Further particulars and application forms are available from: The Registrar, The University of New England, Armidale, New South Wales 2351. Closing date: 10th October, 1975.

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